45th ESPEN Congress
on Clinical Nutrition & Metabolism

Live healthY with Optimal Nutrition
Lyon, France | 11-14 September 2023

45th ESPEN CONGRESS

EUROPEAN SOCIETY FOR CLINICAL NUTRITION AND METABOLISM

Accuracy of estimated versus measured resting energy expenditure in older hospitalized patients at the medical ward

P042-T

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INTRODUCTION

Indirect calorimetry (IC) is considered the Gold Standard to measure resting energy expenditure (mREE) in clinical practice. However, this method is more time-consuming than using estimates (eREE).

AIM

The *aims of this* study were to determine;
- the accuracy between estimated and measured energy requirement
- if specific variables were related to the difference between eREE and mREE.

METHOD

The patient's mREE was assessed with IC until a minimum of 5 minutes with a Coefficient of Variation < 10% was obtained[a].

The mREE was compared with eREE calculated from the Harris-Benedict equation (H-B). A variation of ± 10% was regarded as an acceptable variation value.

The following variables were registered:
- Body Mass Index (BMI)
- Body temperature, Heart rate, Middle Arterial Pressure (MAP), Respiration Frequency (RF)
- p-C-Reactive Protein (p-CRP), b-Leucocytes, p-Albumin, and CRP/albumin-ratio.

CONCLUSIONS

By using the H-B-equation (eREE) about half of the patients differ more than ±10% from the measured energy requirement (mREE).

Several infectious variables are correlated with an increase in mREE compared with estimated by the H-B equation (eREE).

RESULTS

- We included 110 patients (58% women), mean age 82 (±7.8) years (*Table 1*).
- Compared with IC the H-B-equation underestimated with a mean of -286 kJ (± 969) (*Figure 1*).
- Accordance between mREE and eREE was found in n=57 (52%). Using the H-B equation REE was overestimated in n=18 (16%) and underestimated in n=35 (32%) of patients (*Figure 2*).
- Underestimation by using the H-B equation compared with IC was significantly correlated with having a higher value of the variables illustrated in *Figure 3*.
- No significant correlation was found between underestimation and: BMI (p=0.086), MAP (p=0.401), RF (p=0.258), p-albumin (p=0.254).

Table 1. Patient characteristics	n=110
Sex, women, n (%)	64 (58%)
Age, years, mean ± SD	82 ± 7.8
BMI, kg/m², median (IQR)	24 (21-29)
NRS-2022, ≥ 3 points, n (%)	53 (48%)
Wards patients were included from	
Geriatrics, n (%)	43 (39%)
Endocrinology, n (%)	42 (38%)
Infection medicine, n (%)	25 (23%)

Measurement with Indirect Calorimetry

S.N. Engelsted
Privat pictures

Figure 1. Bland-Altman plot
Compared with IC the H-B-equation underestimated with a mean of -286 kJ (±969).

Figure 2. Accordance between H-B and IC.
Variation within ± 10%

16.4% 51.8% 31.8%

1 HBaboveIC_M1   2 HBequalsIC_M1   3 HBbelowIC_M1
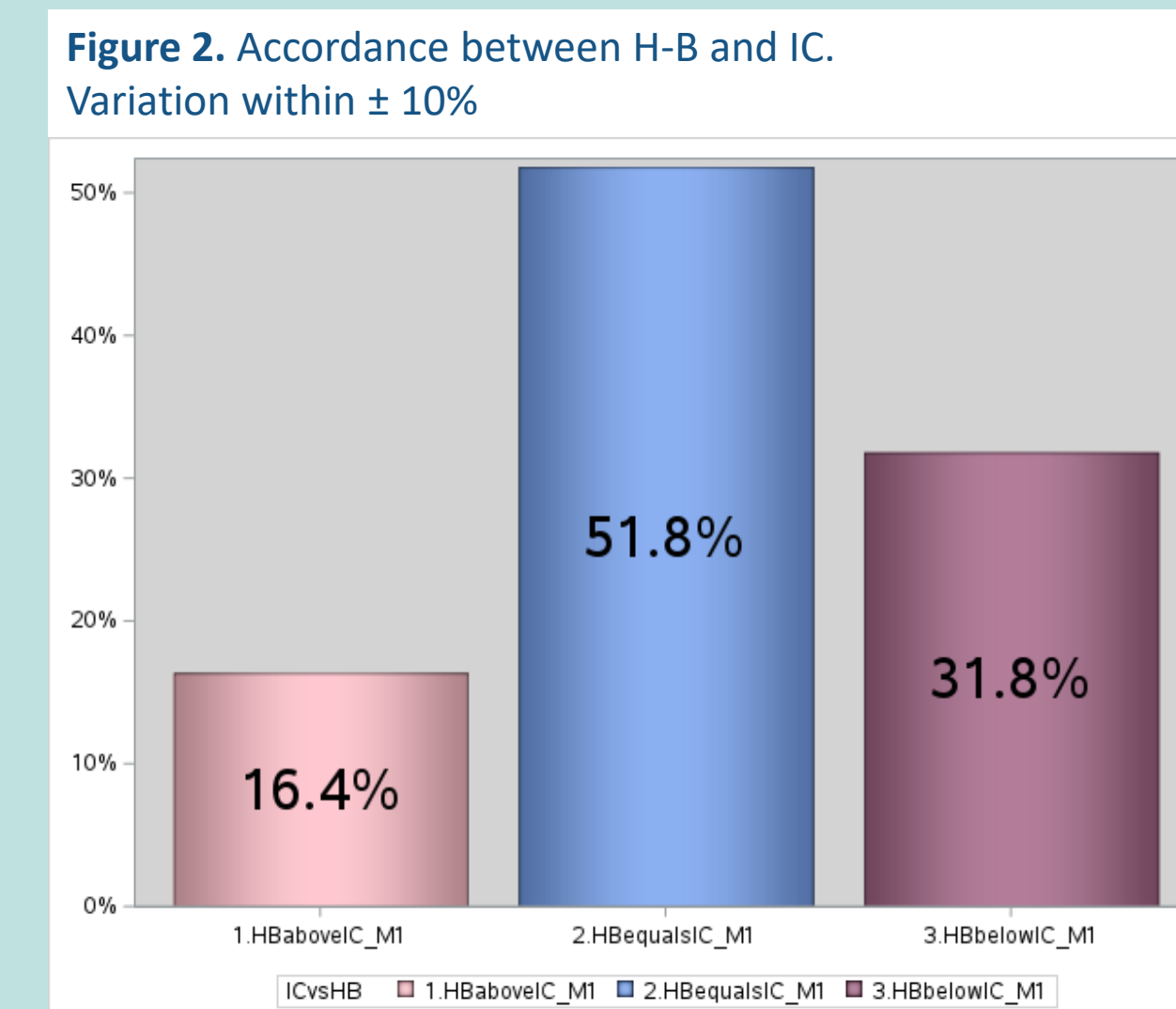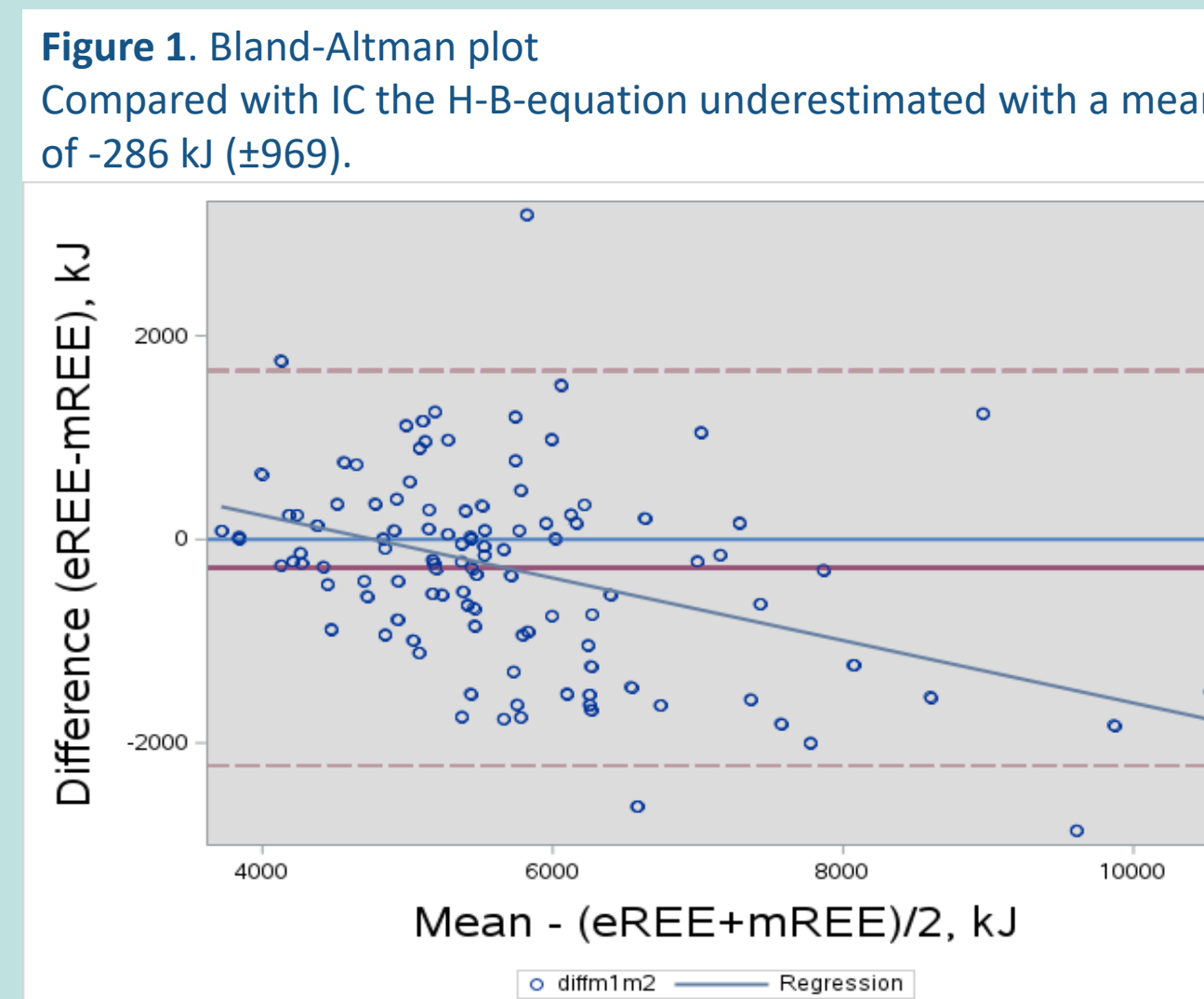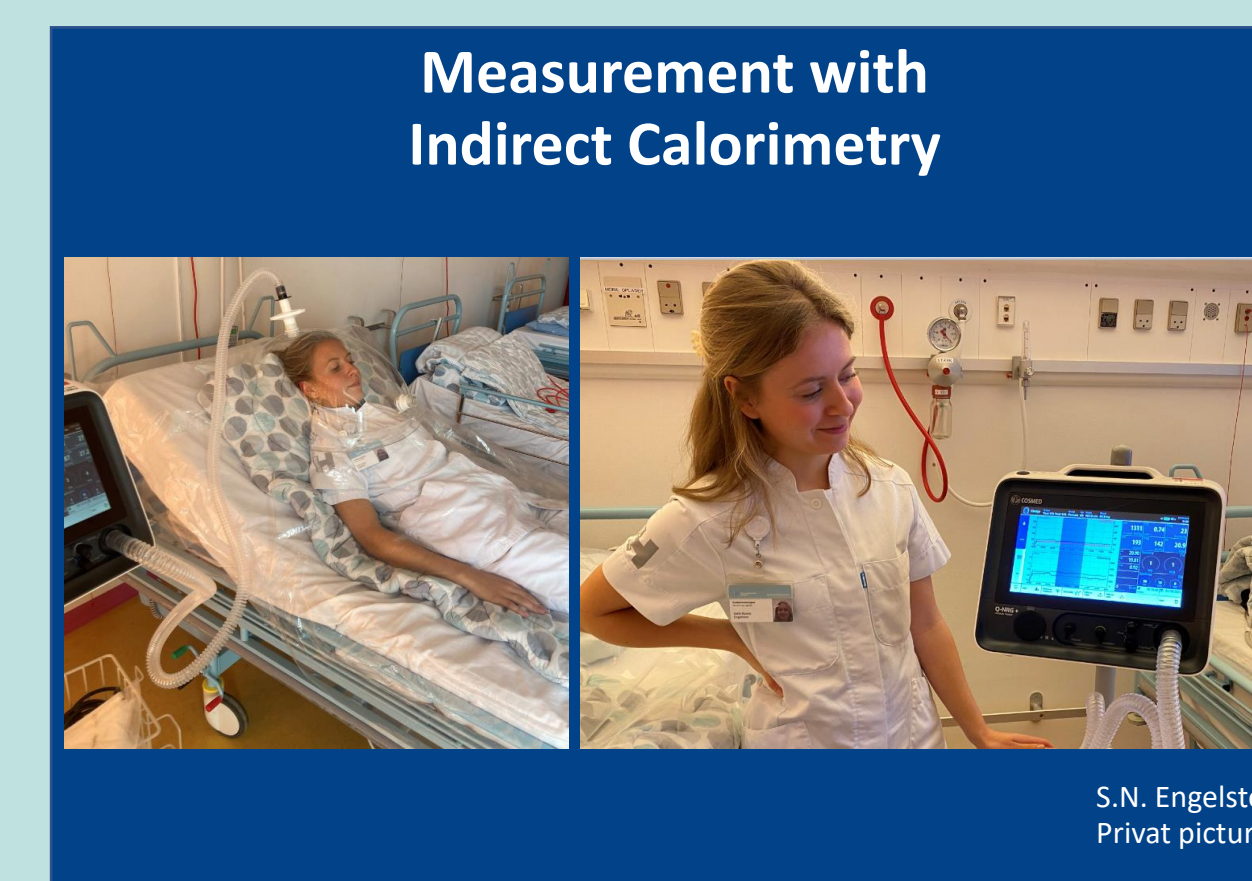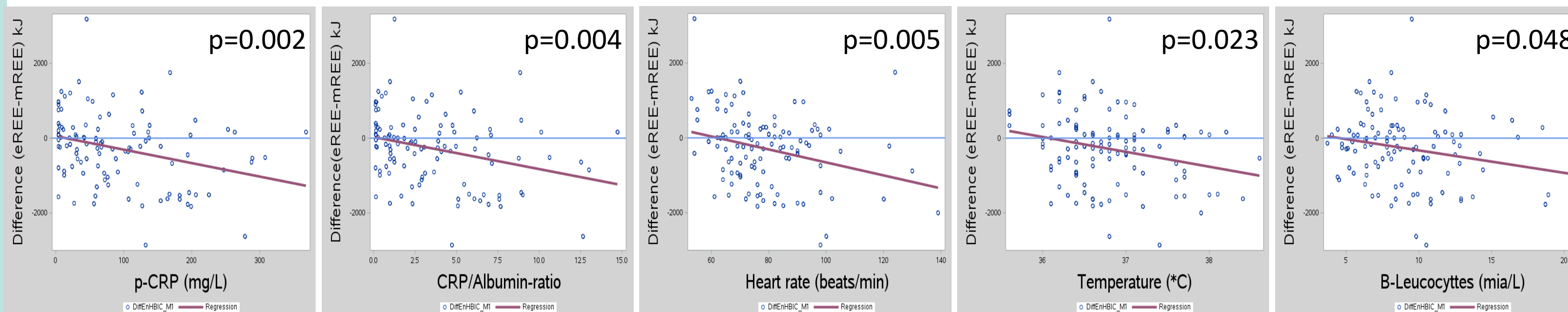ICvsHB   ☐ 1 HBaboveIC_M1   ☐ 2 HBequalsIC_M1   ☐ 3 HBbelowIC_M1

Figure 3. Variables correlated with difference in REE (eREE-mREE) Underestimation by using the H-B equation compared with IC was correlated with higher values of the variables illustrated in the scatter-plots (p<0.05 is regarded as significant, correlations, pearson/spearman).

p=0.002 — p-CRP (mg/L)
p=0.004 — CRP/Albumin-ratio
p=0.005 — Heart rate (beats/min)
p=0.023 — Temperature (°C)
p=0.048 — B-Leucocyttes (mia/L)

REFERENCES

[a] Compher C, Frankenfield D, Keim N, Roth-Yousey L. Best Practice Methods to Apply to Measurement of Resting   Metabolic Rate in Adults: A Systematic Review. J Am Diet Assoc. 2006 Jun;106(6):881–903.

ACKNOWLEDGEMENT

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