

AuSPEN 2025, Sydney

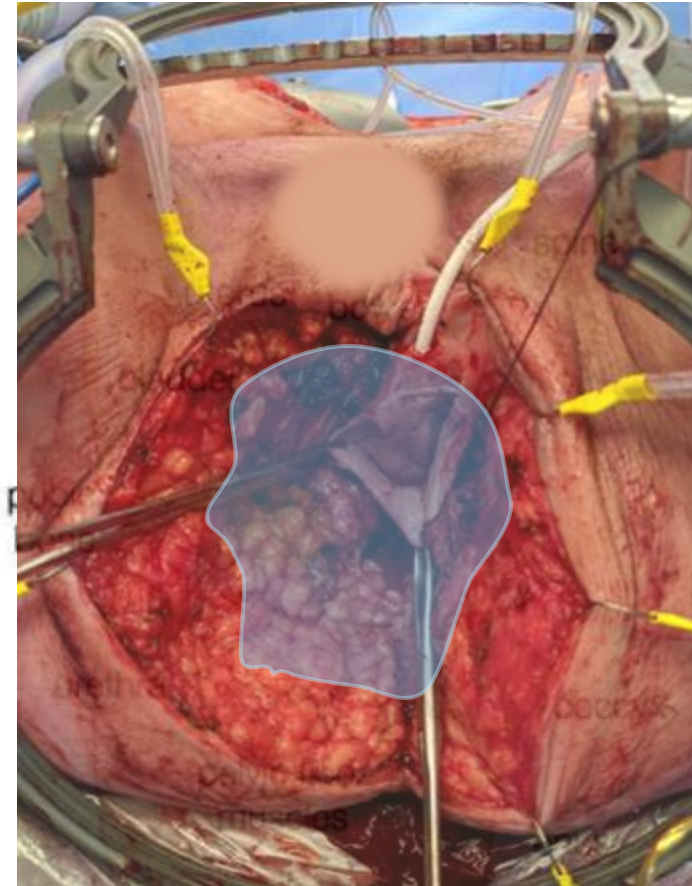
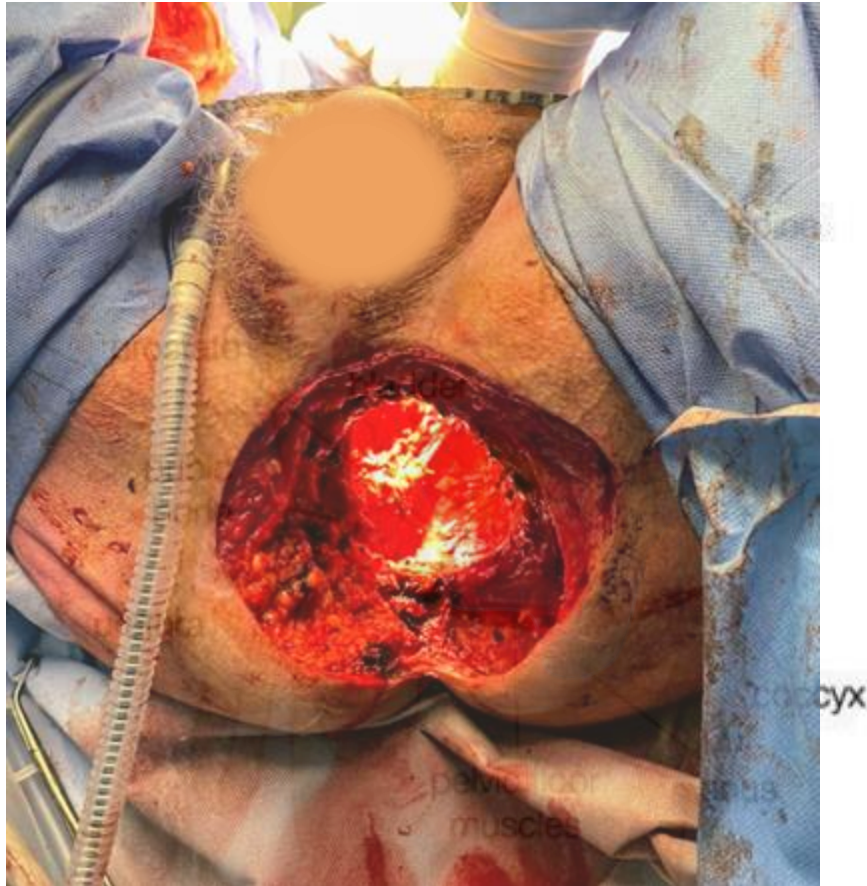
Energy expenditure and nutrition characteristics following pelvic exenteration: A pilot study

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BACKGROUND

Pelvic exenteration is complex and extensive surgery



BACKGROUND

Pelvic exenteration is burdensome & costly

59%
Complication rate

23-38%
Major complication

16 days
Median LOS

High patient
morbidity

Resource heavy

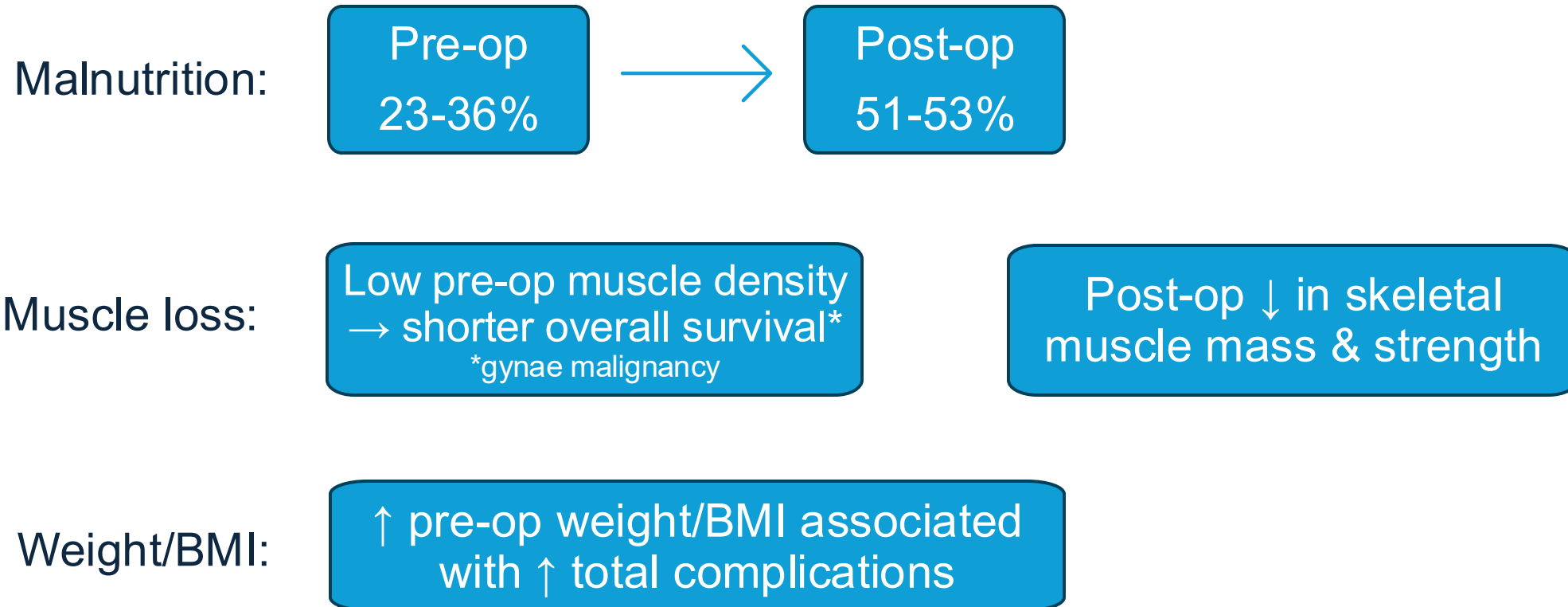
\$108,259 AUD
Inpatient admission cost

6-12 months to regain
physical function

12 months before
sustained QoL
improvement

BACKGROUND

Nutrition & muscle changes with pelvic exenteration



BACKGROUND

Optimal energy targets for PE patients are unclear

- Metabolic impact of PE unknown
- Predictive equations have known inaccuracies
- Indirect calorimetry = gold standard
- Indirect calorimetry use in PE patients' not reported



STUDY AIM:

Primary aim:

To quantify the impact of PE on Energy Expenditure (EE) using indirect calorimetry (IC)

Secondary aims:

- To evaluate agreement between calculated REE from commonly used predictive equations (Schofield) and measured REE (IC)
- To assess feasibility of recruitment and study conduct
- To describe nutrition intake (energy & protein)
- To determine malnutrition prevalence

STUDY DESIGN & METHODS:

Single-centre, prospective, observational, pilot study

Participants:

Inclusion	Exclusion
≥ 18 years of age	Known anxiety or claustrophobia preventing IC measurement
Consented to undergo PE	Known pre-existing inborn errors of metabolism
	Suspected or confirmed SARS-CoV-2

Sample size: n=20 with primary outcome data

DATA COLLECTION:

Collected Data	PreOp (Before PE)	POD +7 ± 24h	POD +14 ± 24h
EE using IC (Cosmed Q-NRG+™)	✓	✓	✓
Malnutrition Assessment - PG-SGA	✓	✓	✓
Energy & protein intake (24h recall)	✓	✓	✓
Skeletal Muscle Index via CT & Sliceomatic™	✓		

POD; Post Operative Day



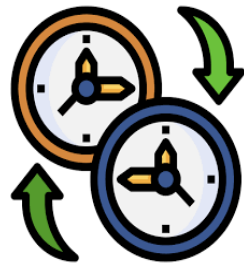
Extracted Data

Demographics & characteristics	✓
Surgical & clinical outcomes	✓

STATISTICAL ANALYSIS:



- Mean (SD)
- Median [IQR]
- n (%)



Change over time:

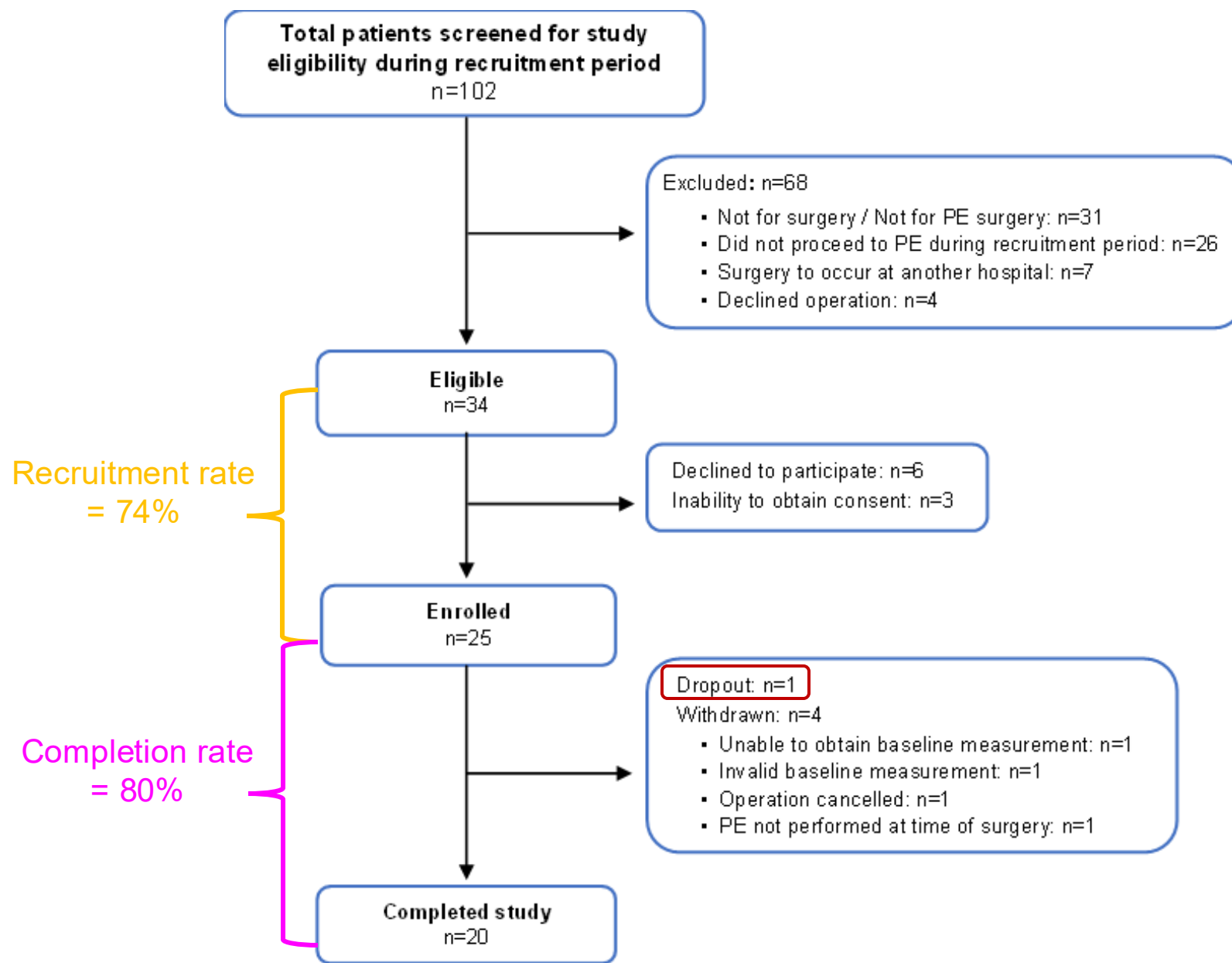
- Friedman's test with Wilcoxon signed-rank test (non-parametric)
 $p < 0.05$



Agreement between IC vs Schofield:

- Bland Altman analysis
- Lin's Concordance Correlation Coefficient (CCC)

RESULTS:



RESULTS:

Participant demographics,
characteristics & outcomes

Variable	n (%)
Age, years, Median [IQR]	67 [45-77]
Male:Female	8:12 (40:60)
BMI, kgm ² , Mean±SD	26±4
Low PreOp SMI	12 (60)
Tumour Type	
Colorectal (including anal)	13 (65)
Other	5 (25)
Benign	2 (10)
Primary/Recurrence	
Primary	15 (75)
Recurrence	5 (25)
Type of exenteration	
Total	10 (50)
Partial	10 (50)
Operation duration, minutes, Mean±SD	503±175
Post op ICU admission	4 (20)
Postoperative complication	17 (85)
Highest grade of complication (Clavien-Dindo)	
Minor (1-2)	10 (50)
▶ Major (≥3)	7 (35)
Hospital LOS, days, Median (IQR)	17 [12-23]
Readmission (30d)	3 (15)
Mortality (30d)	0 (0)

RESULTS:

Energy expenditure



	Before Surgery n=20	POD 7 n=19	POD 14 n=16	p-value
Median [IQR]				
REE-IC				
kcal	1520 [1254-1997]	1501 [1343-1657]	1638 [1331-1926]	0.809*
kcal/kg	23 [18-23]	24 [19-25]	23 [18-25]	0.836
Schofield-REE				
kcal	1409 [1321-1555]	1403 [1309-1518] ^a	1374 [1306-1569] ^b	0.005
kcal/kg	19 [18-23]	20 [19-24]	20 [20-25]	0.697

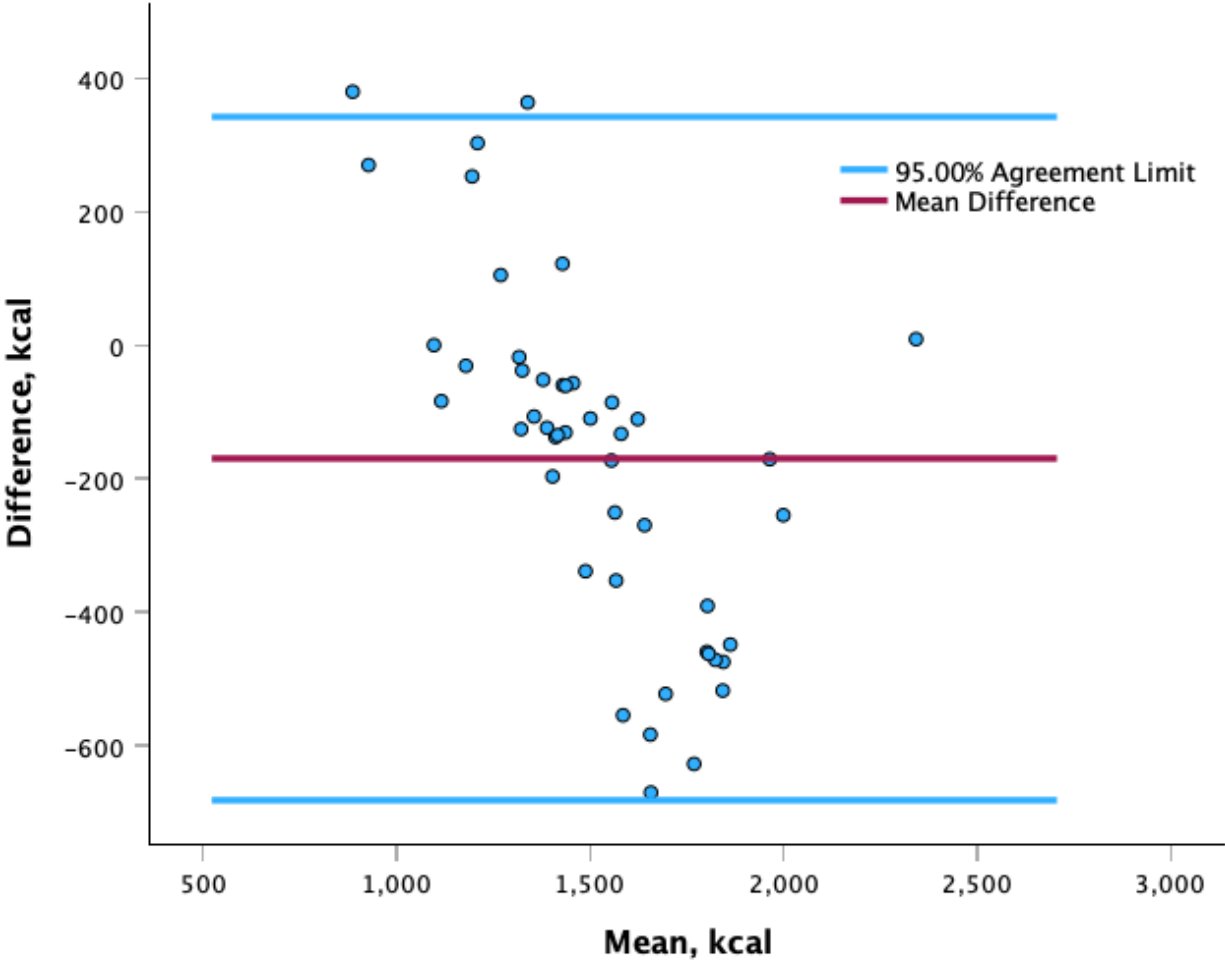


POD, Post-Operative Day

Different superscript letters on the same line indicate where $p < 0.05$

*Values shown as median [IQR] for comparability; IC was normally distributed. Friedman's test performed on participants with complete data across all three time points ($n=15$)

RESULTS: Predicted vs Indirect Calorimetry REE



Bland Altman Plot - Schofield-predicted and measured REE, all timepoints

Lin's Concordance Correlation Coefficient (95% CI)

All timepoints	
REE-Predicted (Schofield)	0.57 (0.20- 0.77)

Accuracy and precision of Schofield predictive equations compared to Indirect Calorimetry

RESULTS:

Nutrition intake & malnutrition status



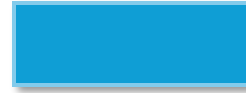
	Before Surgery n=20	POD 7 n=19	POD 14 n=16	p-value
Intake, Mean (SD)				
kcal	1652 (662)	1267 (698)	1785 (613)	0.050
Protein, g	65 (31)	47 (26)	68 (25)	0.050
PG-SGA - malnutrition				
PG-SGA score, Median [IQR]	5 [2-9]	15 [13-16]	12 [9-16]	<0.001
Global rating, n (%)				<0.001
A: Well nourished	15 (75)	0 (0)	0 (0)	
B: Moderate/suspected	4 (20)	19 (95)	16 (100)	
C: Severe	1 (5)	1 (5)	0 (0)	



STRENGTHS & LIMITATIONS:



Novel
Foundational
Hypothesis-generating
Repeated measures



Single centre
Small sample
Timing of IC measurements
Not including injury factors

CONCLUSIONS & IMPLICATIONS

PE surgery did not increase energy expenditure



- Larger, adequately powered trials required
- ? stratify according to PE type

Schofield vs IC agreement analysis showed wide intra- and inter- individual variability

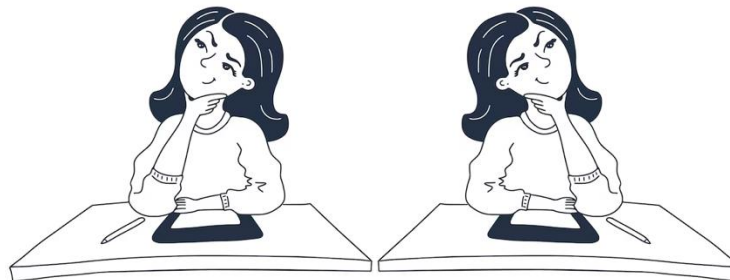


- Consider IC (where feasible)
- How do other predictive equations fair?

Nutrition intake declined and malnutrition increased



- Impact of nutritional decline on outcomes?
- Investigation into barriers to nutrition provision



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Co-Authors

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THANK YOU

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