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Nutritional Evaluation and Optimisation in Neonates (NEON) trial of amino acid regimen and intravenous lipid composition in preterm parenteral nutrition: a randomised double-blind controlled trial

Sabita Uthaya, Xinxue Liu, Daphne Babalis, Caroline Dore, Jane Warwick, Jimmy Bell, Louise Thomas, Deborah Ashby, Giuliana Durighel, Ash Ederies, Monica Yanez-Lopez and Neena Modi

NHS
National Institute for Health Research

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Nutritional Evaluation and Optimisation in Neonates (NEON) trial of amino acid regimen and intravenous lipid composition in preterm parenteral nutrition: a randomised double-blind controlled trial

Sabita Uthaya,[1,2*] Xinxue Liu,[3] Daphne Babalis,[3,4] Caroline Dore,[5] Jane Warwick,[3] Jimmy Bell,[6] Louise Thomas,[6] Deborah Ashby,[2] Giuliana Durighel,[6] Ash Ederies,[7] Monica Yanez-Lopez[4] and Neena Modi[1,2]

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Abstract

Nutritional Evaluation and Optimisation in Neonates (NEON) trial of amino acid regimen and intravenous lipid composition in preterm parenteral nutrition: a randomised double-blind controlled trial

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[7]Institute of Clinical Sciences, Imperial College London and Medical Research Council Clinical Sciences Centre, Hammersmith Hospital, London, UK

*Corresponding author s.uthaya@imperial.ac.uk

Background: [illegible]

Objective: [illegible]

Design: [illegible]

Setting: [illegible]

Participants: [illegible]

Interventions: [illegible]

[illegible] 2016. [illegible] et al. [illegible]

Primary outcome measure: [illegible] 37 [illegible] 44 [illegible]

Results: [illegible] 168 [illegible] 31 [illegible] 133 [illegible] 1.0 [illegible] 5% [illegible] ( ) −108 [illegible] 111 [illegible] (a [illegible] 1.1, 5% 0.8 [illegible] 1.6). [illegible] >7 [illegible] 75% [illegible] 4 % ($p < 0.01$) [illegible] >10 [illegible] 4 % [illegible] 18% ($p < 0.01$). [illegible] (l [illegible] −0.8 [illegible] 5% −1.5 [illegible] −0.1 [illegible] $p = 0.02$). [illegible]

Limitations [illegible]

Conclusions: [illegible]

Future work: [illegible]

Trial registration: [illegible] 2 66531 [illegible] 200 -016731-34.

Funding: [illegible]

[illegible]

Contents

List of tables ix

List of figures xi

List of abbreviations xiii

Plain English summary xv

Scientific summary xvii

Chapter 1 Introduction 1

[illegible] 1

Preterm infants 1

[illegible] 1

[illegible] 2

[illegible] 3

[illegible] 3

[illegible] 4

[illegible] 5

Chapter 2 Research objectives 7

[illegible] 7

[illegible] 7

Chapter 3 Methods 9

[illegible]

[illegible]

Inclusion criteria

Exclusion criteria

[illegible]

[illegible] 11

Primary outcomes 11

Secondary outcomes 11

[illegible] 11

Electronic case record form 11

Timescale of trial evaluations 11

Schedule of investigations 12

[illegible] 13

Anthropometry 13

Blood pressure measurements 13

Magnetic resonance imaging 13

Quantitative insulin sensitivity check index 15

[illegible] 15

Serious adverse events 15

Expectedness and causality of serious adverse events 16

Reporting of adverse events 16

Adverse events 16

[illegible] 17

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

Sample size 17
Randomisation 18
Blinding 18
Statistical methods 18
Missing data 1
Statistical analysis plan 1
[illegible] 1
Trial management 1
Trial sponsor 1
Ethical considerations 1
[illegible] 20
Regulatory requirements 20
Trial registration 20
National Institute for Health Research Clinical Research Network portfolio 20
Summary of protocol amendments 20
Trial committees 21
Data management 22
Risk assessment and monitoring plan 22
Monitoring visits 22
Investigational medicinal product manufacturer 22
Patient and public involvement 22

Chapter 4 Results **23**
[illegible] 23
Screening 23
[illegible] 24
Recruitment rate 24
Baseline data 24

Chapter 5 Discussion **59**

Chapter 6 Conclusions and recommendations **63**
[illegible] 63
[illegible] 63

Acknowledgements **65**

References **67**

Appendix 1 Distribution of primary and secondary outcomes after transformation **73**

Appendix 2 Parent information sheet, magnetic resonance information sheet and consent form **75**

List of tables

TABLE 1 Summary of interventions 10

TABLE 2 Summary of tests and investigations 12

TABLE 3 Definitions for assessment of causality 16

TABLE 4 Definitions of SpAEs including thresholds for reporting to the DMEC 17

TABLE 5 Baseline characteristics for all infants randomised 28

TABLE 6 Baseline characteristics for all infants completing MRI assessment 29

TABLE 7 Parenteral nutrition details and blood culture results for all infants randomised 30

TABLE 8 Parenteral nutrition details and blood culture results for all infants completing MRI assessment 31

TABLE 9 Trial PN intake during the first 7 days for all infants randomised 32

TABLE 10 Trial PN intake during the first 7 days for all infants completing MRI assessment 33

TABLE 11 Total nutrition intake during the first 7 days, 3 weeks, 4 weeks and by 34 weeks of gestational age for all infants randomised 35

TABLE 12 Nutritional intake over the first 2 weeks for all infants randomised 37

TABLE 13 Nutritional intake during the study period for all infants randomised 38

TABLE 14 Nutritional intake over first 2 weeks for all infants completing MRI assessment 40

TABLE 15 Nutritional intake during the study period for all infants completing MRI assessment 41

TABLE 16 Safety data: summary of laboratory AEs by treatment for all infants randomised 44

TABLE 17 Safety data: summary of laboratory AEs by treatment for all infants completing MRI assessment 45

TABLE 18 Safety data: summary of SAEs by treatment 47

TABLE 19 Baseline characteristics and trial outcomes (all infants completing primary outcome assessments) 48

S 2016. et al. S 16

TABLE 20 Adipose tissue compartments in litres for all infants completing MRI assessment 51

TABLE 21 Summary of the covariates for secondary analysis 52

TABLE 22 Primary outcomes (pairwise comparisons) 53

List of figures

FIGURE 1 Classification of AT depots 14

FIGURE 2 The Consolidated Standards of Reporting Trials diagram 23

FIGURE 3 Summary of screening data for all trial sites 24

FIGURE 4 Cumulative recruitment vs. target recruitment for the duration of the trial 25

FIGURE 5 Cumulative retention (number of MR scans) vs. target retention for the duration of the trial 26

FIGURE 6 Total recruitment and retention per centre 27

FIGURE 7 Means (95% CIs) of Inc-AA and Imm-RDI in two lipid subgroups for (a) non-adipose body mass; and (b) IHCL content on a log-scale 47

FIGURE 8 Time trend for babies' weights across four groups 54

FIGURE 9 Daily protein intake from all sources in the first 2 weeks across four groups 54

FIGURE 10 Daily carbohydrate intake from all sources in the first 2 weeks across all four groups 55

FIGURE 11 Daily fat intake from all sources in the first 2 weeks across all four groups 55

FIGURE 12 Daily energy intake from all sources in the first 2 postnatal weeks 56

FIGURE 13 Daily protein intake from all sources after first 2 weeks across all four groups 56

FIGURE 14 Daily carbohydrate intake from all sources after first 2 weeks across all four groups 57

FIGURE 15 Daily fat intake from all sources after first 2 weeks across four groups 57

FIGURE 16 Daily energy intake from all sources after the first 2 postnatal weeks 58

FIGURE 17 Distribution of primary and secondary outcomes after transformation 73

[illegible] 2016. [illegible] et al. [illegible] 16 [illegible]

List of abbreviations

This report should be cited as: [illegible] et al. [illegible] 2016. [illegible] 16[illegible].

Plain English summary

[illegible]

Scientific summary

Background

[illegible]

Lipid intervention

[illegible] 20% [illegible] (/ [illegible] *n*-6 [illegible] *n*-3 [illegible]) [illegible] 20% [illegible]

- [illegible]
- [illegible].

Methods

Trial design

[illegible] 2 [illegible] 24 [illegible] (1) [illegible] (-AA) [illegible] (I I -) [illegible] 1 [illegible] (2) [illegible] 20% [illegible] 20% [illegible].

[illegible]

1. -AA [illegible] 20% [illegible] (-AA/ [illegible])
2. -AA [illegible] 20% [illegible] (-AA/[illegible])
3. I I -AA [illegible] 20% [illegible] (I I - / [illegible])
4. I I -AA [illegible] 20% [illegible] (I I - /[illegible]).

Participants

[illegible] ([illegible] 31 [illegible]) [illegible].

Inclusion criteria

- [illegible] 31 [illegible] ([illegible] ≤30 [illegible] 6 [illegible]).
- [illegible].

Exclusion criteria

- [illegible].
- [illegible] 24 [illegible].

Interventions

[illegible] (1) [illegible] (2) [illegible]. [illegible] 24 [illegible] 1.7. /_ / [illegible] 1 [illegible] 2.1. /_ / [illegible] 2 [illegible] 2.7. /_ / [illegible] 3. [illegible] 3.6. /_ / [illegible] 1. [illegible] 1 [illegible] 2, [illegible] 0I. /_ / [illegible] 120I. /_ / [illegible] 3 [illegible] 8.6. /_ / [illegible] 1 [illegible] 2. /_ / [illegible] 1 [illegible] 3. /_ / [illegible] 2 [illegible] 20% [illegible] 20% [illegible] 1 [illegible] 17.00. [illegible] 0 .00 [illegible] 17.00. [illegible] 1 [illegible].

[illegible] 150 [illegible] 24 [illegible].

Outcomes

Primary outcomes

[illegible] 37 [illegible] 44 [illegible].

Measurement of lean body mass

[illegible].

Measurement of intrahepatocellular lipid content

[illegible] 37 [illegible] 44 [illegible].

Secondary outcomes

- [illegible].
- [illegible].
- [illegible] (L [illegible]).
- [illegible].
- [illegible].
- [illegible].

Sample size and statistical analysis

[illegible] 64 [illegible] (I [illegible] -AA) [illegible] 80% [illegible] (5% [illegible]) [illegible] 200 [illegible] 400. [illegible] 1.75 (S 1.85), [illegible] 0.14–7.72. [illegible] 0.121 (S 1.052) [illegible] –1. 7 2.04. [illegible] 64 [illegible] 80% [illegible] (5% [illegible]) [illegible] 0.53 [illegible] 40% [illegible] 10% [illegible] 10% [illegible] 44 [illegible], [illegible] 160 [illegible] 64 [illegible].

[illegible] 13 (S [illegible] SA).

Results

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Trial registration

[illegible] 2 66531 [illegible] 200 –016731–34.

Funding

[illegible]

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

Chapter 1 Introduction

Background

Preterm infants

[illegible] 31 [illegible] 1–1.5% [illegible] 70,000 [illegible] 8000 [illegible] 31 [illegible][1] [illegible][2] [illegible][3,4] [illegible][5,6]

Rationale for trial

[illegible] (A).[7] [illegible][8] [illegible]

[illegible] 30 [illegible] 400 [illegible] 14 [illegible][10,11] [illegible]

[illegible][12] [illegible][13,14] [illegible][15] [illegible][16] [illegible][8]

[illegible] (A) [illegible][17] [illegible] (A) [illegible][18,1] [illegible]

[illegible] S 2016. [illegible] *et al.* [illegible] S 16 [illegible]

[illegible] 6 [illegible].[20]

Nutritional requirements of preterm babies

[illegible][21] [illegible] *et al.*[22] [illegible]

$$E_{[illegible]} = E_{[illegible]} + E_{[illegible]} + E_{[illegible]}, \quad (1)$$

[illegible] ([illegible]) [illegible] = [illegible] + [illegible] ([illegible]).

[illegible] G [illegible][23–25] [illegible] *et al.*[7] [illegible] ([illegible]) [illegible].[11]

[illegible] *et al.*[26], [illegible] 1 [illegible] (> 3 [illegible]) ($n = 26$) [illegible] (< 3 [illegible]) ($n = 22$). [illegible] (S) 46.7 375.2 [illegible] 1238 407 [illegible] $p < 0.05$, [illegible] (4% [illegible]).

[illegible][27,28] [illegible].

Parenteral nutrition

[illegible] 31 [illegible] 12 [illegible] 80–100 [illegible] 150,000 [illegible] ( ). [illegible]

[illegible] 2 [illegible] 2011, [illegible] 2 [illegible]), [illegible] 30

[illegible] 3–4 [illegible] 2 [illegible] (S [illegible] 31 [illegible]

Previous studies of parenteral nutrition

[illegible] 27,28 [illegible] ([illegible]) [illegible]

[illegible] 1 [illegible] *et al.*[32,33] [illegible] 4 [illegible] 7 [illegible]

[illegible] S 2016. [illegible] *et al.* [illegible] ([illegible]) [illegible] S 16 [illegible]

[illegible] *n*-3 [illegible] *n*-6 *n*-3 [illegible].[43] [illegible] 20% [illegible].[31,44] [illegible].[31]

Need for the Nutritional Evaluation and Optimisation in Neonates trial

[illegible]

Chapter 2 Research objectives

[illegible]

Amino acid intervention

[illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Lipid intervention

[illegible] 20% [illegible] *n*-6 [illegible] *n*-3 [illegible] 20% [illegible]

- [illegible]
- [illegible]

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

Chapter 3 Methods

Trial design

[illegible]

1. [illegible] 20% [illegible] ([illegible])
2. [illegible] 20% [illegible] ([illegible])
3. [illegible] 20% [illegible] ([illegible])
4. [illegible] 20% [illegible] ([illegible]).

Participants

[illegible]

Inclusion criteria

- [illegible]
- [illegible]

Exclusion criteria

- [illegible]
- [illegible]

Interventions

[illegible]

[illegible] *Table 1*.

[illegible] et al. [illegible]

TABLE 1 Summary of interventions

Intervention component	Day 1	Day 2	Day 3 onwards
Inc-AA/Intralipid			
[illegible]	0	0	120
[illegible]	1.5	1.	2.4
[illegible]	1.7	2.1	2.7
[illegible]	8.6	8.6	8.6
20% [illegible]	2	3	3
Inc-AA/SMOFlipid			
[illegible]	0	0	120
[illegible]	1.5	1.	2.4
[illegible]	1.7	2.1	2.7
[illegible]	8.6	8.6	8.6
20% [illegible]	2	3	3
Imm-RDI/Intralipid			
[illegible]	0	0	120
[illegible]	3.2	3.2	3.2
[illegible]	3.6	3.6	3.6
[illegible]	8.6	8.6	8.6
20% [illegible]	2	3	3
Imm-RDI/SMOFlipid			
[illegible]	0	0	120
[illegible]	3.2	3.2	3.2
[illegible]	3.6	3.6	3.6
[illegible]	8.6	8.6	8.6
20% [illegible]	2	3	3

Outcomes

Primary outcomes

[illegible] 37 [illegible] 44 [illegible]

Measurement of lean body mass

[illegible]

Measurement of intrahepatocellular lipid content

[illegible] 37 [illegible] 44 [illegible]

Secondary outcomes

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Data collection

Electronic case record form

[illegible] 4.6 (S 0, [illegible] 1088 [illegible] SA) [illegible] 10 ([illegible] 10.2.0.4.0 – 64 [illegible] SA) [illegible]

Timescale of trial evaluations

Daily evaluations

[illegible] 24 [illegible] (± 2 [illegible]), [illegible] 37 [illegible] ([illegible]).

Weekly evaluations

[illegible] 7 ± 2 [illegible] 7 [illegible] (± 2 [illegible]) [illegible] 37 [illegible].

Monthly evaluation

[illegible] 30 [illegible] (± 5 [illegible]) [illegible] 30 [illegible] (± 5 [illegible]) [illegible] 37 [illegible].

[illegible] 28 [illegible]

[illegible] 2016. [illegible] et al. [illegible] 16 [illegible]

The 37-week evaluation

[illegible] 37 [illegible] (±1 [illegible]) [illegible]

The end-of-study evaluation

[illegible] 37–44 [illegible] ([illegible]) [illegible] 37 [illegible] 44 [illegible]

Schedule of investigations

[illegible] *Table 2.*

TABLE 2 Summary of tests and investigations

Evaluation	Baseline	Daily	Weekly	Monthly	37 weeks corrected age	End of study (37–44 weeks and discharge from the NICU)
[illegible]	✓					
[illegible]	✓					
[illegible]	✓					
[illegible]	[illegible]	[illegible]	[illegible]			✓
[illegible]	[illegible]		[illegible]			✓
[illegible]	[illegible]		[illegible]			✓
[illegible]	[illegible]		✓			✓
[illegible]	✓	✓				
Safety						
[illegible] (24 [illegible])		[illegible]				
[illegible] (24 [illegible])		[illegible]				
[illegible]		[illegible]			[illegible]	
[illegible]			[illegible]			
[illegible] ([illegible])				[illegible]		
[illegible]		✓	✓		✓	✓
Efficacy						
[illegible]					✓	
[illegible]						✓
[illegible]	✓				✓	
[illegible]			✓			

✓ [illegible]

Clinical investigations

Anthropometry

[illegible]

Blood pressure measurements

[illegible]

Magnetic resonance imaging

[illegible] 45–60 [illegible]

Magnetic resonance imaging body composition

Acquisition of images

[illegible] 1.5- [illegible] 37 [illegible] 44 [illegible] 1.5- [illegible]

[illegible] 1.5- [illegible] 1- [illegible] (500 [illegible] 17 [illegible] 3) [illegible] 5 [illegible] 5 [illegible] 0.31 0.31 0.31 [illegible] 12 [illegible] 1 [illegible] 514 [illegible] 11 [illegible]).

Analysis of images

[illegible] 4.2 [illegible] [illegible] 2) [illegible] 3) [illegible] <3%.[45] [illegible] 0. 0 [illegible].[46,47]

[illegible] =([illegible]) 0. 0. (2)

[illegible]

[illegible] =([illegible])/([illegible]). (3)

[illegible] 2016. [illegible] et al. [illegible] 16 [illegible]

[illegible] [45] (*Figure 1*). [illegible]

Hepatic magnetic resonance spectroscopy

Acquisition of spectra

[illegible]

Analysis of spectra

[illegible] [48–50] [illegible]

Brain magnetic resonance imaging

Acquisition of images

[illegible]

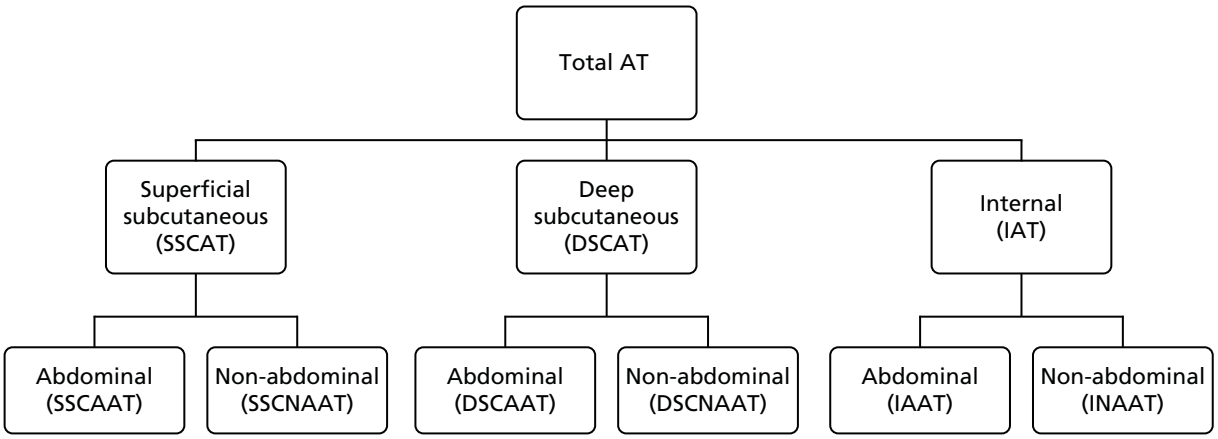


FIGURE 1 Classification of AT depots. DSCAAT, deep subcutaneous abdominal adipose tissue; DSCAT, deep subcutaneous adipose tissue; DSCNAAT, deep subcutaneous non-abdominal adipose tissue; IAAT, internal non-abdominal adipose tissue; IAT, internal adipose tissue; INAAT, internal non-abdominal adipose; SSCAAT, superficial subcutaneous abdominal adipose tissue; SSCAT, superficial subcutaneous adipose tissue; SSCNAAT, superficial subcutaneous non-abdominal adipose tissue. Adapted with permission from Modi N *et al.*, *Pediatric Research* 2009;**65**:584–7.[45]

- 2-[illegible] 220 220 4 [illegible] 2 [illegible] 1.15 1.42 1 [illegible] 256 [illegible] 160 [illegible] 15,077 [illegible] 0 [illegible] 2 [illegible].
- [illegible] 175 144 75 [illegible] 0.8 0 [illegible] 0.61 0.61 [illegible] 12 [illegible] 23 [illegible] 16 [illegible] 512 [illegible] 5 [illegible].
- [illegible] 224 224 4 [illegible] 2.5 0 [illegible] 2 2 [illegible] 128 [illegible] 4 [illegible] 4 ,70 [illegible] 750 [illegible] 2 [illegible] 6 [illegible].

Analysis of images

[illegible]

[illegible] 2-[illegible][51] [illegible]

[illegible]

- [illegible] ([illegible]), [illegible]
- [illegible] ([illegible]) [illegible]
- [illegible].

Quantitative insulin sensitivity check index

[illegible][52] [illegible][53] [illegible] ([illegible]) [illegible].

Pharmacovigilance definitions and procedures

Serious adverse events

[illegible] ( ), [illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible].

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible].

Expectedness and causality of serious adverse events

[illegible] *Table 3.*

Reporting of adverse events

[illegible] 24 [illegible] 2 [illegible]

Adverse events

[illegible] *Table 4.* [illegible] *Table 4.*

TABLE 3 Definitions for assessment of causality

Relationship	Description
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible]

[illegible]

TABLE 4 Definitions of SpAEs including thresholds for reporting to the DMEC

Assessment (blood test)	Level requiring SpAE report	Level requiring reporting to the DMEC
G[illegible]	<2.6[illegible] >15[illegible]	[illegible]
[illegible] 24 [illegible]	>15[illegible]	>15[illegible]
[illegible]	>150 [illegible]	>150 [illegible]
[illegible]	>40 [illegible]	>40 [illegible]
[illegible]	>6[illegible]	>10[illegible]
[illegible]	>2.5[illegible]	>5[illegible]
S[illegible]	<131[illegible] >150[illegible]	[illegible]
[illegible]	<3.2[illegible] > [illegible]	[illegible]
[illegible]	<1.5[illegible] >3[illegible]	[illegible]
[illegible]	<1[illegible] >3[illegible]	[illegible]
[illegible]	<1.5[illegible] >7[illegible]	>10[illegible]
[illegible]	>170 [illegible]	[illegible]
[illegible]	>60 [illegible]	[illegible]
[illegible]	<8 [illegible]	[illegible]
[illegible]	<2 [illegible]	[illegible]
[illegible]	>30 [illegible]	[illegible]
[illegible]	>0.4 [illegible]	[illegible]
[illegible]	<20 [illegible]	[illegible]

[illegible]

Annual safety reports

[illegible]

Statistical considerations

Sample size

[illegible] 2003 [illegible] 2.1 [illegible] (S[illegible] 0.4 [illegible]).[17] [illegible] - [illegible] 2.6 [illegible] (S[illegible] 0.21 [illegible] 450 [illegible], 5% [illegible] 300 [illegible] 610 [illegible]). [illegible] 64 [illegible] 200 [illegible] 80% [illegible] 5% [illegible].

S[illegible],[18] [illegible] 15 [illegible] 24 [illegible] 32.6 [illegible]. [illegible] - [illegible] 1.75 (S[illegible] 1.85, [illegible] 0.14–7.72) [illegible] 0.121 (S[illegible] 1.052, [illegible]–1.[illegible] 2.04). [illegible] 64 [illegible] 80% [illegible] 0.526 [illegible] 5% [illegible] (/[illegible] *t*-[illegible]). [illegible] 40% [illegible].

[illegible] S[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible].

A [illegible] 10% [illegible] 10% [illegible] 80 [illegible] 64 [illegible] 128 [illegible].

Randomisation

[illegible] (1:1) [illegible] (block randomisation) [illegible].

[illegible] 25% [illegible] ([illegible][54]). [illegible] (23–26, 27–31 [illegible]), [illegible] (< 500, 500–1000, > 1000) [illegible].

[illegible]

[illegible] 13 ([illegible]).

[illegible] 20% [illegible].

Missing data

[illegible].

[illegible].

Statistical analysis plan

[illegible].

Trial organisation

Trial management

[illegible]).

[illegible].

Trial sponsor

[illegible] 13 565/ _4122427. [illegible].

Ethical considerations

[illegible] 8 [illegible] 200 [illegible].

Consent

[illegible]

Research governance

[illegible]

Regulatory requirements

[illegible] 2004.[56] [illegible] 8 [illegible] 2010 [illegible] 200 -016731-34.

Trial registration

[illegible] 2 66531 .

National Institute for Health Research Clinical Research Network portfolio

[illegible]

Summary of protocol amendments

[illegible]

- [illegible] 2
  - [illegible]
    - [illegible] 25% [illegible]
    - [illegible] ([illegible])
    - [illegible] >28 [illegible].
  - [illegible].
  - [illegible] ([illegible]).
- [illegible] 3
  - [illegible] 1 [illegible] 5 [illegible]
  - [illegible] 12 [illegible] 24 [illegible].
  - [illegible].

- [illegible] 4
  - [illegible] 2 [illegible] (S[illegible]). A[illegible].

Trial committees

Trial steering committee

A S[illegible] 26 [illegible] 2010, 14 [illegible] 2011 [illegible] 22 [illegible] 2012. [illegible] ([illegible]) [illegible] S[illegible].

S[illegible].

- [illegible]
  - [illegible] ([illegible]).
  - [illegible] ([illegible]).
  - [illegible]
  - [illegible]
- [illegible]
  - S[illegible] ([illegible]).
  - [illegible]
  - [illegible]
  - [illegible]
  - [illegible].
  - [illegible] A[illegible].

Data Monitoring and Ethics Committee

A [illegible] SA[illegible]. [illegible] 2 A[illegible] 2010, 13 [illegible] 2011 [illegible] 27 S[illegible] 2012.

[illegible] 2 A[illegible] 2010. [illegible] 32 [illegible] 13 [illegible] 2011 [illegible] 64 [illegible] 27 S[illegible] 2012. [illegible] S[illegible].

[illegible]

- [illegible] ([illegible]).
- [illegible] ([illegible]).
- [illegible].
- [illegible].

Data management

[illegible]

Risk assessment and monitoring plan

[illegible] 20% [illegible] 100% [illegible] 100% [illegible]

Monitoring visits

[illegible]

Investigational medicinal product manufacturer

[illegible]

Patient and public involvement

[illegible]

Chapter 4 Results

Participant flow

[illegible] *Figure 2*, [illegible].

Screening

[illegible] 31 [illegible] 382 [illegible], 168 [illegible]. *Figure 3* [illegible].

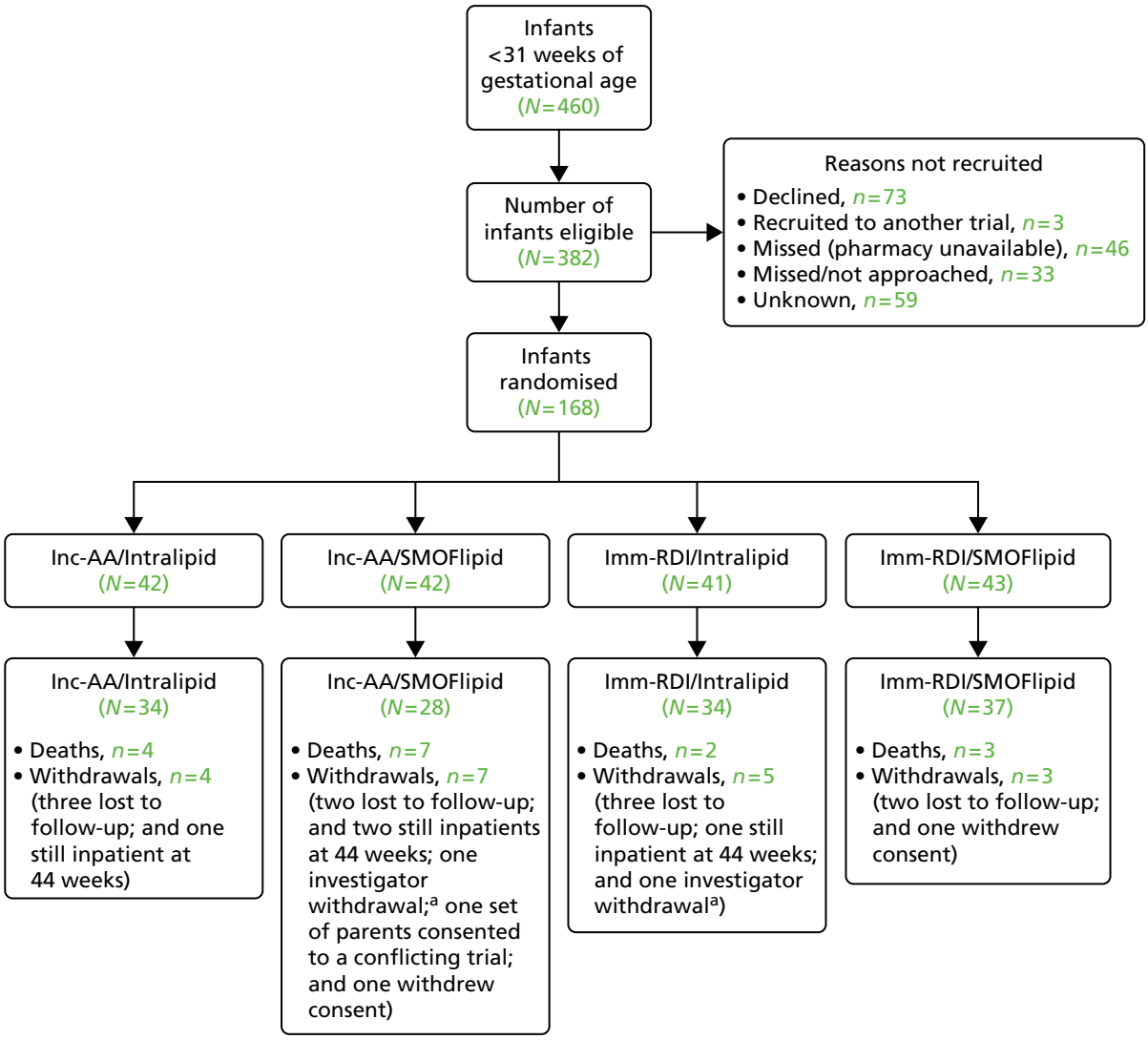


FIGURE 2 The Consolidated Standards of Reporting Trials diagram. a, Investigator withdrawal: in both cases, this occurred when the infant was transferred to a non-trial site very soon after randomisation and was therefore unable to receive the trial intervention.

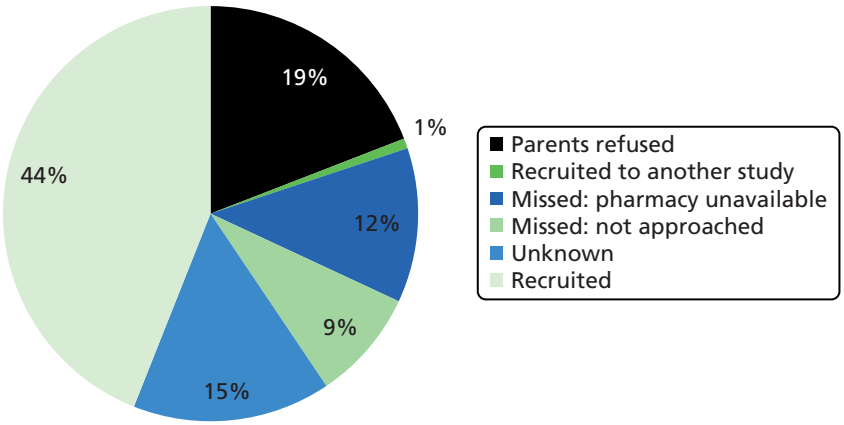


FIGURE 3 Summary of screening data for all trial sites.

Recruitment and retention

[illegible] 3 [illegible] 6 [illegible] 2010 [illegible] 31 [illegible] 2013. [illegible] 2.5 [illegible]

(a) [illegible]
( ) [illegible]
( ) [illegible]
( ) [illegible]

Recruitment rate

[illegible] 2012) [illegible]

Figures 4–6 [illegible]

Baseline data

[illegible] *Tables 5* [illegible] 6, [illegible] 437 [illegible] 31 [illegible] 168 [illegible] 133 [illegible]

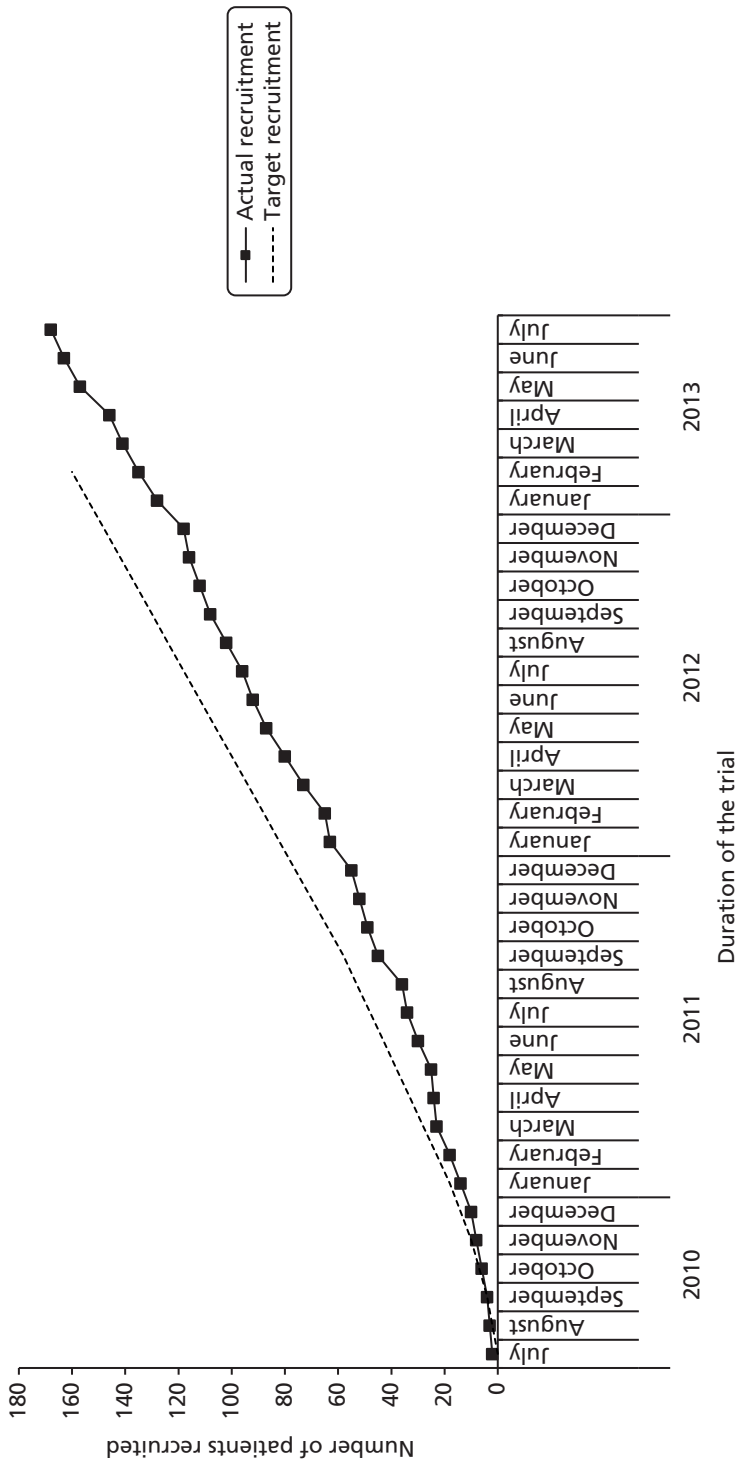


FIGURE 4 Cumulative recruitment vs. target recruitment for the duration of the trial.

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

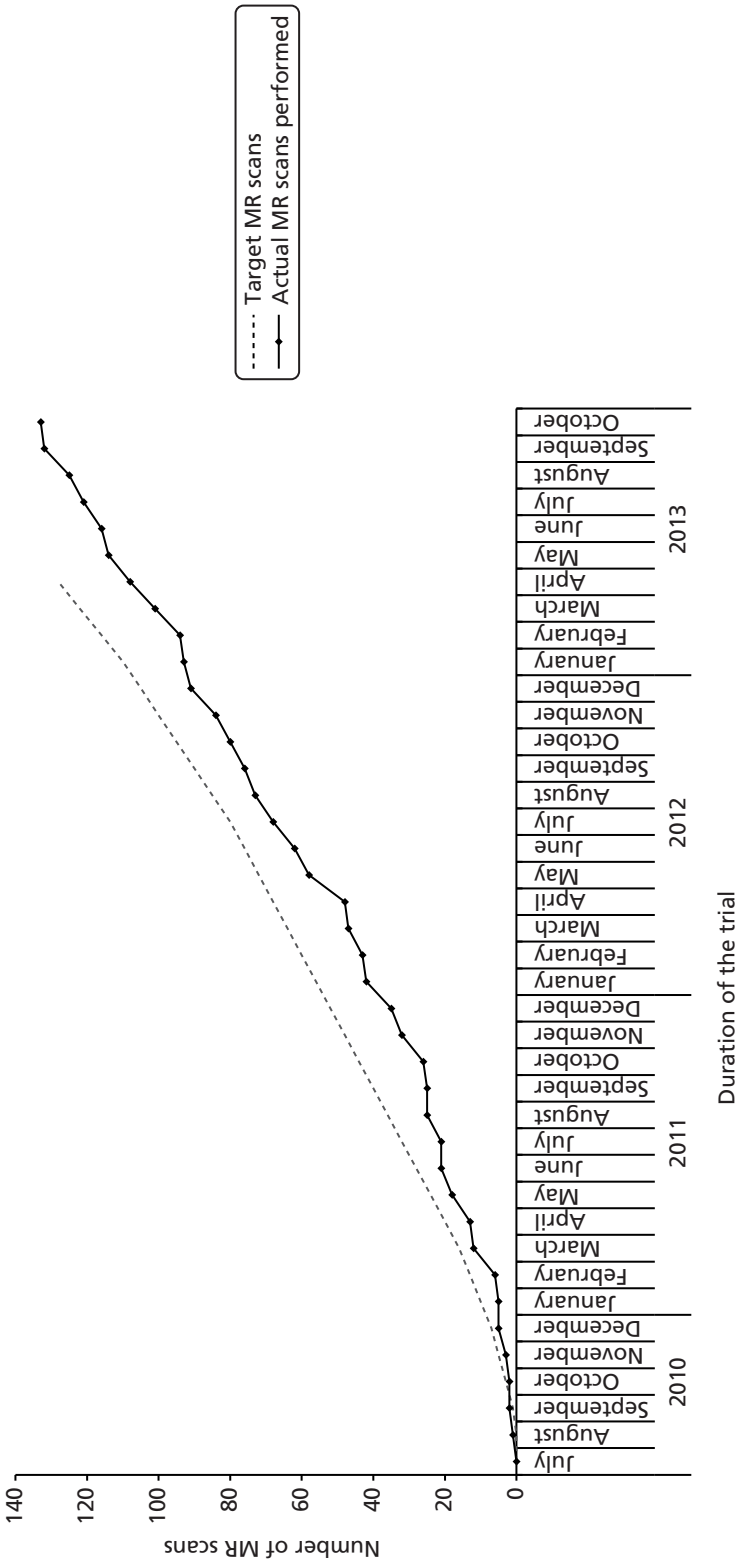


FIGURE 5 Cumulative retention (number of MR scans) vs. target retention for the duration of the trial.

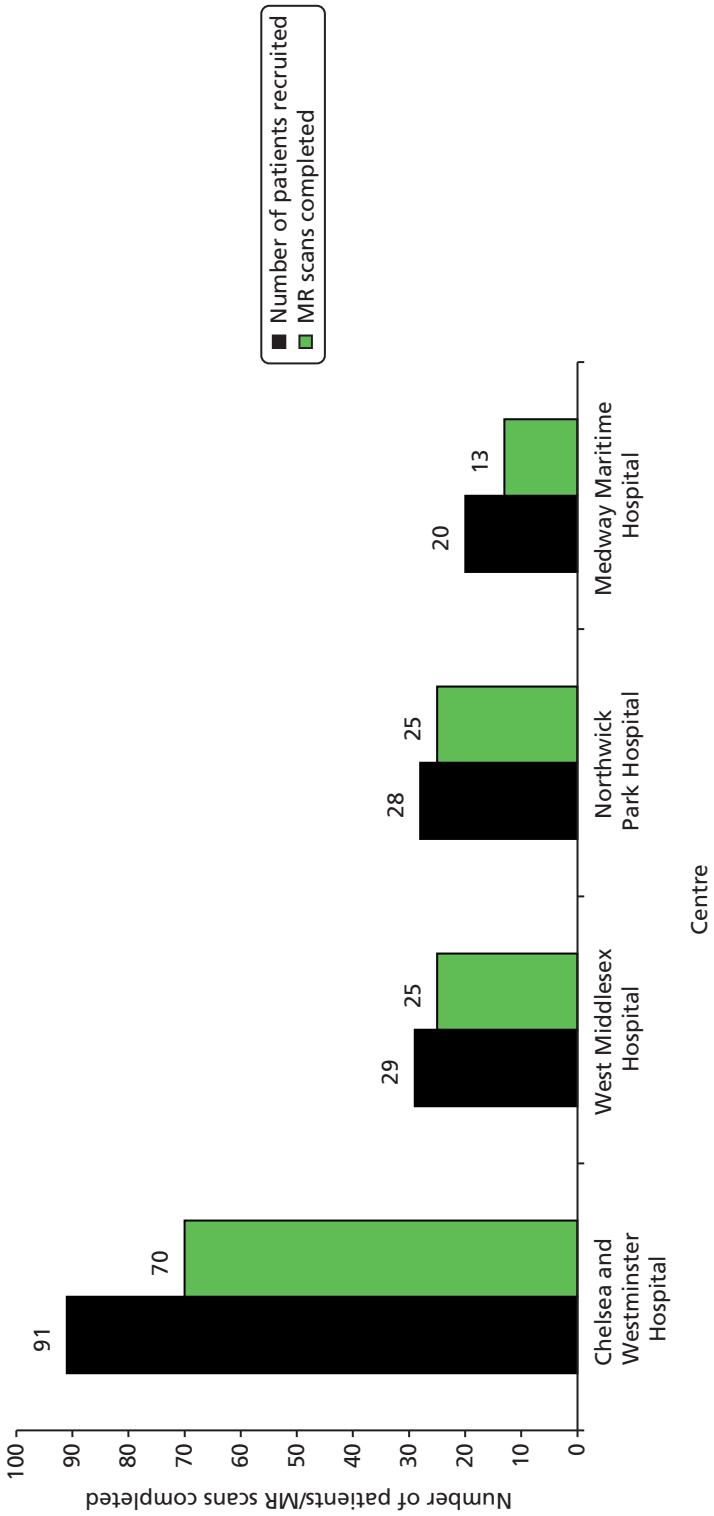


FIGURE 6 Total recruitment and retention per centre.

TABLE 5 Baseline characteristics for all infants randomised[a]

Characteristic	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible], *n* (%)				
[illegible]	28 (66.7)	26 (61.)	21 (51.2)	22 (51.2)
G[illegible], [illegible] (S)	27.8 (1.)	27.5 (2.4)	28.1 (2.1)	27.8 (2.1)
[illegible], *n* (%)				
[illegible]	6 (14.3)	6 (14.3)	(22.0)	15 (34.)
[illegible], [illegible] (S)	1.03 (0.2)	1.05 (0.34)	1.04 (0.28)	1.06 (0.2)
[illegible] (I), [illegible] (S)	35.1 (3.5) *n* = 31	34.6 (4.2) *n* = 32	35.1 (3.) *n* = 26	35.2 (5.2) *n* = 32
[illegible] (I), [illegible] (S)	25.3 (2.0) *n* = 41	25.0 (3.0) *n* = 40	25.3 (1.) *n* = 37	25.6 (2.) *n* = 3
[illegible] (*z*-[illegible]), [illegible] (S)	–0.2 (1.0) *n* = 42	0.1 (1.0) *n* = 41	–0.2 (1.0) *n* = 41	0 (0.) *n* = 43
[illegible] (*z*-[illegible]), [illegible] (S)	–1.0 (1.0) *n* = 30	–0. (1.2) *n* = 24	–1.1 (1.0) *n* = 25	–0.8 (1.5) *n* = 2
[illegible] (*z*-[illegible]), [illegible] (S)	–0.5 (0.) *n* = 41	–0.3 (1.0) *n* = 3	–0.7 (0.) *n* = 37	–0.2 (1.6) *n* = 41
[illegible] (S)	32. (5.3) *n* = 42	31.3 (7.7) *n* = 42	32. (6.3) *n* = 40	32.5 (6.6) *n* = 43
[illegible] (S)	66.4 (13.3) *n* = 34	65. (11.4) *n* = 25	64. (13.0) *n* = 30	68.5 (15.2) *n* = 33
[illegible] (I), [illegible] (S)	161. (7.8) *n* = 33	164. (7.7) *n* = 27	161.3 (.2) *n* = 27	164.5 (8.6) *n* = 32
[illegible] (S)	80.8 (10.7) *n* = 27	82.3 (13.2) *n* = 22	85.3 (16.1) *n* = 24	86.3 (14.) *n* = 31
[illegible] (I), [illegible] (S)	178.4 (6.5) *n* = 28	17 .6 (6.8) *n* = 22	175.7 (10.0) *n* = 22	182.0 (.7) *n* = 30
[illegible], *n* (%)				
[illegible]	16 (38.1)	1 (45.2)	21 (51.2)	21 (48.8)
[illegible]	14 (33.3)	7 (16.7)	12 (2 .3)	12 (27.)
[illegible]	6 (14.3)	13 (31.0)	6 (14.6)	6 (14.0)
[illegible]	2 (4.8)	2 (4.8)	1 (2.4)	2 (4.7)
[illegible]	3 (7.1)	0 (0)	1 (2.4)	2 (4.7)
[illegible]	1 (2.4)	1 (2.4)	0 (0)	0 (0)
[illegible], *n* (%)				
[illegible]	8 (1 .1)	18 (42.)	16 (3 .0)	17 (3 .5)
[illegible]	7 (16.7)	3 (7.1)	4 (.8)	2 (4.7)
[illegible]	27 (64.3)	21 (50.0)	21 (51.2)	24 (55.8)
[illegible], *n* (%)				
[illegible]	30 (71.4)	34 (81.0)	32 (78.1)	35 (81.4)
[illegible]	7 (16.7)	6 (14.3)	7 (17.1)	4 (.3)
[illegible]	5 (11.)	2 (4.8)	2 (4.)	4 (.3)
[illegible], [illegible] (S)	18.4 (12.3–22.7) *n* = 42	1 .5 (13.6–22.8) *n* = 41	20.4 (12.6–23.6) *n* = 40	17.7 (13.0–22.4) *n* = 43

[illegible]

TABLE 6 Baseline characteristics for all infants completing MRI assessment[a]

Characteristic	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/SMOFlipid (*N* = 37)
[illegible], *n* (%)				
[illegible]	20 (58.8)	18 (64.3)	17 (50.0)	1 (51.4)
G[illegible], [illegible] (S)	28.0 (1.8)	28.0 (2.1)	28.4 (2.1)	27.7 (2.0)
[illegible], *n* (%)				
[illegible]	4 (11.8)	3 (10.7)	8 (23.5)	13 (35.1)
[illegible], [illegible] (S)	1.06 (0.2)	1.10 (0.32)	1.0 (0.28)	1.06 (0.2)
[illegible], [illegible] (S)	35.5 (3.5) *n* = 28	35.1 (4.0) *n* = 24	35.6 (3.5) *n* = 24	34. (4.) *n* = 27
[illegible], [illegible] (S)	25.3 (2.0) *n* = 34	25.6 (2.6) *n* = 26	25.5 (1.) *n* = 32	25.7 (2.) *n* = 34
[illegible] (*z*-[illegible]), [illegible] (S)	–0.1 (0.)	0 (1.0)	–0.2 (1.0)	0.1 (0.)
[illegible] (*z*-[illegible]), [illegible] (S)	–0. (1.1) *n* = 28	–1.0 (1.3) *n* = 21	–1.0 (1.0) *n* = 23	–1.1 (1.4) *n* = 25
[illegible] (*z*-[illegible]), [illegible] (S)	–0.5 (0.) *n* = 34	–0.4 (1.0) *n* = 26	–0.7 (0.) *n* = 32	–0.2 (1.7) *n* = 34
[illegible], [illegible] (S)	32.6 (5.4) *n* = 34	30.3 (7.8) *n* = 26	32.2 (6.4) *n* = 33	32.7 (6.7) *n* = 34
[illegible], [illegible] (S)	67.6 (14.5) *n* = 27	63.8 (11.5) *n* = 17	64.7 (13.3) *n* = 26	68.5 (16.1) *n* = 2
[illegible], [illegible] (S)	162.4 (7.2) *n* = 26	165.1 (7.3) *n* = 1	162.1 (.1) *n* = 23	164.8 (.1) *n* = 28
[illegible], [illegible] (S)	82.3 (11.5) *n* = 21	81.5 (14.0) *n* = 15	84.1 (15.) *n* = 22	87.8 (14.7) *n* = 28
[illegible], [illegible] (S)	177.8 (6.1) *n* = 22	17 .3 (7.4) *n* = 15	175.6 (10.2) *n* = 20	182.8 (.6) *n* = 27
[illegible], *n* (%)				
[illegible]	13 (38.2)	11 (3 .3)	17 (50.0)	1 (51.4)
[illegible]	10 (2 .4)	6 (21.4)	11 (32.4)	(24.3)
[illegible]	5 (14.7)	10 (35.7)	5 (14.7)	6 (16.2)
[illegible]	2 (5.)	1 (3.6)	0 (0)	2 (5.4)
[illegible]	3 (8.8)	0 (0)	1 (2.)	1 (2.7)
[illegible]	1 (2. 4)	0 (0)	0 (0)	0 (0)
[illegible], *n* (%)				
[illegible]	6 (17.6)	(32.1)	13 (38.2)	15 (40.5)
[illegible]	5 (14.7)	2 (7.1)	4 (11.8)	1 (2.7)
[illegible]	23 (67.7)	17 (60.7)	17 (50.0)	21 (56.8)
[illegible], *n* (%)				
[illegible]	24 (70.6)	21 (75.0)	26 (76.5)	30 (81.1)
[illegible]	5 (14.7)	5 (17.)	6 (17.7)	4 (10.8)
[illegible]	5 (14.7)	2 (7.1)	2 (5.)	3 (8.1)
[illegible], ([illegible]), [illegible] ( )	16. (10.5–22.3) *n* = 34	1 .4 (12.1–22.3) *n* = 28	20.0 (12.4–23.5) *n* = 34	17.7 (13.2–22.4) *n* = 37

[illegible] (S) [illegible] ([illegible]). [illegible] ([illegible]).

[illegible] 2016. [illegible] et al. [illegible] 16 [illegible].

[illegible] 150 [illegible] / [illegible] 24 [illegible] -AA/ [illegible] 12 [illegible] ( ) –17.5 [illegible] -AA/S [illegible] 11.5 [illegible] –16 [illegible] - / [illegible] 11 [illegible] 10–14 [illegible] - /S [illegible] 13 [illegible] .5 –18 [illegible] (-AA/ [illegible] 6 .5 [illegible] 52– 5 [illegible] -AA/S [illegible] 61 [illegible] 5–88 [illegible] - / [illegible] 63 [illegible] 45– 5 [illegible] - /S [illegible] 66.5 [illegible] 44– 8 [illegible]) (*Tables 7* [illegible] *8*).

TABLE 7 Parenteral nutrition details and blood culture results for all infants randomised

Characteristic	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible] ( )				
[illegible] ( )	0 (0–2) *n* = 42	1 (0–5) *n* = 41	0.5 (0–2.5) *n* = 40	1 (0–3) *n* = 43
[illegible] ( )	11.5 (8–20) *n* = 42	13 (8–20) *n* = 41	11 (–15.5) *n* = 40	12 (–18) *n* = 43
[illegible] 150 [illegible] / [illegible] 24 [illegible]	12 (–17.5) *n* = 32	11.5 (–16) *n* = 28	11 (10–14) *n* = 30	13 (.5–18) *n* = 36
[illegible] (%)				
[illegible]	5 (11.)	3 (7.1)	3 (7.3)	(20.)
[illegible]	0 (0)	1 (2.4)	0 (0)	0 (0)
[illegible]	2 (4.8)	1 (2.4)	2 (4.)	2 (4.7)
[illegible]	2 (4.8)	1 (2.4)	2 (4.)	3 (6.7)
[illegible]	1 (2.4)	0 (0)	0 (0)	0 (0)
SA	0 (0)	2 (4.8)	0 (0)	0 (0)
[illegible] (%)	15	13		14
[illegible]	2 (13.3)	1 (7.7)	0 (0)	1 (7.1)
G [illegible]	5 (33.3)	4 (30.8)	3 (33.3)	1 (7.1)
G [illegible]	1 (6.7)	0 (0)	0 (0)	0 (0)
G [illegible] S	2 (13.3)	3 (23.1)	4 (44.4)	7 (50.0)
G [illegible] S	3 (20.0)	4 (30.8)	1 (11.1)	5 (35.7)
G [illegible]	2 (13.3)	1 (7.7)	1 (11.1)	0 (0)
[illegible] ( )	8		8	8
[illegible] ( ), [illegible] ( )	6 .5 (52– 5) *n* = 38	61 (45–88) *n* = 33	63 (45– 5) *n* = 38	66.5 (44– 8) *n* = 38

S [illegible]
G [illegible]

TABLE 8 Parenteral nutrition details and blood culture results for all infants completing MRI assessment

Characteristic	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/ Intralipid (*N* = 34)	Imm-RDI/ SMOFlipid (*N* = 37)
[illegible]				
[illegible]	0 (0–2)	1 (0–5.5)	1 (0–3)	1 (0–3)
[illegible]	11 (8–17)	13.5 (8.5–1[illegible].5)	10.5 ([illegible]–15)	12 ([illegible]–18)
[illegible] 150[illegible] 24 [illegible]	11 ([illegible]–16) *n* = 28	11.5 ([illegible]–16) *n* = 22	11 (10–13.5) *n* = 28	13 (10–18) *n* = 33
[illegible] (%)				
[illegible]	3 (8.8)	2 (7.1)	3 (8.8)	6 (16.2)
[illegible]	2 (4.8)	1 (2.4)	2 (4.[illegible])	1 (2.7)
[illegible]	2 (4.8)	1 (2.4)	2 (4.[illegible])	3 (8.1)
[illegible] (%)		4	5	12
[illegible]	2 (22.2)	0 (0)	0 (0)	1 (8.3)
G[illegible]	3 (33.3)	3 (75.0)	3 (60.0)	0 (0)
G[illegible]	0 (0)	0 (0)	0 (0)	0 (0)
G[illegible]	1 (11.1)	0 (0)	1 (20.0)	6 (50.0)
G[illegible]	2 (22.2)	0 (0)	0 (0)	5 (41.7)
G[illegible]	1 (11.1)	1 (25.0)	1 (20.0)	0 (0)
[illegible]	5	3	4	7
[illegible] ([illegible]), [illegible]	6[illegible].5 (55–[illegible]6) *n* = 34	5[illegible] (44–85) *n* = 28	60.5 (44–88) *n* = 34	67 (47–[illegible]8.5) *n* = 36

[illegible]

[illegible] 4, [illegible] -AA [illegible] 2.5 [illegible] 2.6 [illegible] -AA/[illegible] -AA/S [illegible] 3.3 [illegible] 3.1 [illegible] / [illegible] / S [illegible] (*Table 9*). *Table 10* [illegible] 2[illegible] 22.4 ([illegible] 16.0–28.4[illegible]) [illegible] 20.[illegible] ([illegible] 15.3–28.4[illegible]) [illegible] -AA/[illegible] -AA/S [illegible] 25.[illegible] ([illegible] 22.6–32.5[illegible]) [illegible] 2[illegible].5 ([illegible] 23.2–37.2[illegible]) [illegible] / [illegible] / S [illegible] 34 [illegible] 138.2 ([illegible] 10[illegible] –170.7[illegible]) [illegible] 11[illegible].0 ([illegible] 1.1–161.0[illegible]) [illegible] -AA/[illegible] -AA/S [illegible] 124.8 ([illegible] 103.1–175.3[illegible]) [illegible] 148.3 ([illegible] 122.1–170.7[illegible]) [illegible] / [illegible] / S [illegible]. *Tables 11–13* [illegible]. *Tables 14* [illegible] *15* [illegible].

[illegible] S 2016. [illegible] *et al.* [illegible] 16 [illegible].

TABLE 9 Trial PN intake during the first 7 days for all infants randomised

Trial PN intake by day	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible] 1, [illegible] (S)	*n* = 3	*n* = 34	*n* = 37	*n* = 41
[illegible]	71.1 (36.2)	6 .5 (34.3)	6 .2 (36.7)	68.1 (35.6)
[illegible]	8.8 (5.2)	8.6 (4.6)	8.5 (5.3)	7. (4.5)
[illegible]	1.2 (0.7)	1.2 (0.6)	2.5 (1.3)	2.4 (1.3)
[illegible]	6.8 (3.5)	6.7 (3.3)	6.6 (3.5)	6.4 (3.4)
[illegible]	1.8 (1.0)	1.7 (0.)	1.7 (1.1)	1.6 (0.)
[illegible] 2, [illegible] (S)	*n* = 3	*n* = 38	*n* = 3	*n* = 42
[illegible]	6.5 (20.8)	8 . (31.1)	4. (16.8)	4.5 (20.)
[illegible]	14.8 (.)	12.8 (5.2)	13.7 (2.6)	14.1 (4.0)
[illegible]	2.1 (0.5)	1. (0.7)	3.1 (0.5)	3.1 (0.7)
[illegible]	8.6 (1.8)	8.1 (2.8)	8.4 (1.4)	8.2 (1.8)
[illegible]	3.0 (2.0)	2.6 (1.0)	2.7 (0.5)	2.8 (0.8)
[illegible] 3, [illegible] (S)	*n* = 3	*n* = 37	*n* = 38	*n* = 42
[illegible]	114.4 (22.4)	112.8 (2 .1)	112.6 (25.1)	114.0 (23.2)
[illegible]	14.3 (3.2)	14.7 (3.8)	13.4 (3.8)	13.4 (4.8)
[illegible]	2.5 (0.5)	2.5 (0.7)	3.1 (0.7)	3.1 (0.7)
[illegible]	8.5 (1.8)	8.3 (2.1)	8.4 (1.8)	8.3 (1.8)
[illegible]	2.8 (0.6)	2. (0.7)	2.6 (0.8)	2.6 (0.)
[illegible] 4, [illegible] (S)	*n* = 40	*n* = 37	*n* = 38	*n* = 40
[illegible]	111.4 (26.0)	117.0 (21.5)	123.4 (14.7)	115. (20.2)
[illegible]	14.2 (5.3)	14.6 (4.2)	15.3 (4.4)	14.0 (4.1)
[illegible]	2.5 (0.6)	2.6 (0.5)	3.3 (0.4)	3.1 (0.5)
[illegible]	8.1 (2.1)	8.4 (1.6)	8. (1.1)	8.4 (1.4)
[illegible]	2.6 (1.0)	2.7 (0.8)	2.8 (0.8)	2.5 (0.7)
[illegible] 5, [illegible] (S)	*n* = 42	*n* = 38	*n* = 38	*n* = 41
[illegible]	106.5 (2 .)	111.3 (23.7)	114.0 (25.1)	112.4 (22.1)
[illegible]	14.4 (4.7)	14. (4.3)	14.8 (4.1)	13.7 (4.7)
[illegible]	2.4 (0.7)	2.5 (0.5)	3.0 (0.7)	3.0 (0.6)
[illegible]	7.7 (2.2)	8.1 (1.6)	8.2 (1.8)	8.1 (1.6)
[illegible]	2.5 (0.8)	2.6 (0.7)	2.6 (0.7)	2.4 (0.8)
[illegible] 6, [illegible] (S)	*n* = 42	*n* = 38	*n* = 38	*n* = 41
[illegible]	100. (34.0)	103.0 (31.6)	103.0 (31.3)	107.5 (27.8)
[illegible]	13.1 (5.4)	13.8 (4.)	13.2 (6.0)	12.8 (5.7)
[illegible]	2.3 (0.8)	2.3 (0.7)	2.8 (0.8)	2. (0.7)
[illegible]	7.3 (2.5)	7.4 (2.3)	7.4 (2.3)	7.7 (2.0)
[illegible]	2.3 (1.0)	2.4 (0.)	2.3 (1.0)	2.3 (1.0)

TABLE 9 Trial PN intake during the first 7 days for all infants randomised (*continued*)

Trial PN intake by day	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible] 7, [illegible] (S)	*n* = 41	*n* = 36	*n* = 36	*n* = 38
[illegible]	3.4 (35.7)	2.4 (31.3)	101.3 (28.2)	100. (25.6)
[illegible]	11.1 (6.1)	11.1 (6.0)	13.1 (7.5)	11.6 (5.6)
[illegible]	2.1 (0.8)	2.1 (0.7)	2.7 (0.8)	2.7 (0.7)
[illegible]	6.8 (2.6)	6.7 (2.3)	7.3 (2.0)	7.3 (1.8)
[illegible]	2.0 (1.1)	1. (1.0)	2.3 (1.3)	2.1 (1.0)

[illegible] 1 [illegible] 17.00.

TABLE 10 Trial PN intake during the first 7 days for all infants completing MRI assessment

Trial PN intake by day	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/ Intralipid (*N* = 34)	Imm-RDI/ SMOFlipid (*N* = 37)
[illegible] 1, [illegible] (S)	*n* = 32	*n* = 25	*n* = 31	*n* = 36
[illegible]	6 .5 (36.2)	70.1 (34.4)	70. (37.6)	67.8 (36.0)
[illegible]	8.4 (5.0)	8.7 (4.5)	8. (5.5)	8.1 (4.7)
[illegible]	1.2 (0.7)	1.2 (0.6)	2.5 (1.3)	2.4 (1.3)
[illegible]	6.7 (3.5)	6.7 (3.3)	6.8 (3.6)	6.4 (3.4)
[illegible]	1.7 (1.0)	1.7 (0.)	1.8 (1.1)	1.6 (0.)
[illegible] 2, [illegible] (S)	*n* = 33	*n* = 27	*n* = 34	*n* = 36
[illegible]	2. (18.5)	8 .5 (22.6)	7.3 (15.3)	7.1 (20.2)
[illegible]	14.7 (10.7)	13.2 (4.4)	13.8 (2.6)	14.6 (3.8)
[illegible]	2.0 (0.4)	1. (0.5)	3.2 (0.5)	3.1 (0.6)
[illegible]	8.3 (1.7)	8.0 (1.)	8.5 (1.3)	8.4 (1.7)
[illegible]	2. (2.1)	2.7 (0.)	2.7 (0.5)	2. (0.7)
[illegible] 3, [illegible] (S)	*n* = 32	*n* = 28	*n* = 34	*n* = 36
[illegible]	116.8 (21.5)	112.2 (32.7)	111.8 (26.3)	117.5 (1 .2)
[illegible]	14.6 (3.4)	14.4 (4.3)	13.3 (4.0)	13. (4.6)
[illegible]	2.6 (0.5)	2.5 (0.7)	3.1 (0.7)	3.2 (0.6)
[illegible]	8.6 (1.8)	8.3 (2.4)	8.4 (1.)	8.6 (1.6)
[illegible]	2.8 (0.6)	2.8 (0.8)	2.6 (0.8)	2.7 (0.)

continued

TABLE 10 Trial PN intake during the first 7 days for all infants completing MRI assessment (*continued*)

Trial PN intake by day	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/ Intralipid (*N* = 34)	Imm-RDI/ SMOFlipid (*N* = 37)
[illegible] 4, [illegible]	*n* = 33	*n* = 28	*n* = 34	*n* = 35
[illegible]	112.4 (26.8)	117.4 (24.4)	123.2 (14.)	118.5 (14.6)
[illegible]	13. (5.6)	14.8 (4.7)	15.6 (3.7)	14.4 (3.5)
[illegible]	2.5 (0.6)	2.6 (0.5)	3.3 (0.4)	3.2 (0.3)
[illegible]	8.2 (2.1)	8.5 (1.8)	8. (1.1)	8.6 (0.)
[illegible]	2.5 (1.0)	2.7 (0.8)	2.8 (0.7)	2.6 (0.6)
[illegible] 5, [illegible]	*n* = 34	*n* = 28	*n* = 34	*n* = 36
[illegible]	107.6 (32.1)	111.0 (25.2)	113.3 (26.2)	112.3 (23.1)
[illegible]	14.3 (5.1)	15.2 (4.1)	14.7 (4.3)	13.5 (5.0)
[illegible]	2.4 (0.7)	2.5 (0.6)	3.0 (0.7)	3.0 (0.6)
[illegible]	7.7 (2.3)	8.0 (1.8)	8.2 (1.)	8.1 (1.7)
[illegible]	2.5 (0.)	2.7 (0.7)	2.6 (0.7)	2.4 (0.)
[illegible] 6, [illegible]	*n* = 34	*n* = 28	*n* = 34	*n* = 35
[illegible]	101.4 (36.8)	104.6 (33.7)	101.5 (32.5)	111.0 (24.1)
[illegible]	13.1 (5.8)	13. (5.4)	13.0 (6.1)	13.2 (5.6)
[illegible]	2.3 (0.8)	2.4 (0.8)	2.7 (0.)	3.0 (0.6)
[illegible]	7.3 (2.7)	7.5 (2.4)	7.3 (2.3)	8.0 (1.7)
[illegible]	2.3 (1.0)	2.4 (0.)	2.3 (1.1)	2.3 (1.0)
[illegible] 7, [illegible]	*n* = 33	*n* = 26	*n* = 32	*n* = 33
[illegible]	3.8 (35.6)	3.2 (34.8)	101. (2 .2)	103.1 (26.3)
[illegible]	11.3 (6.0)	11.4 (6.3)	13.3 (7.8)	12.3 (5.4)
[illegible]	2.1 (0.8)	2.1 (0.8)	2.7 (0.8)	2.8 (0.7)
[illegible]	6.8 (2.6)	6.7 (2.5)	7.3 (2.1)	7.4 (1.)
[illegible]	2.0 (1.1)	2.0 (1.1)	2.4 (1.4)	2.2 (1.0)

[illegible] 1 [illegible] 17.00.

TABLE 11 Total nutrition intake during the first 7 days, 3 weeks, 4 weeks and by 34 weeks of gestational age for all infants randomised

	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible] 1, [illegible] (S)	*n* = 40	*n* = 36	*n* = 3	*n* = 41
[illegible] (/[illegible])	1.3 (0.7)	1.2 (0.7)	2.4 (1.4)	2.5 (1.3)
[illegible] (/[illegible])	7.2 (3.6)	6.6 (3.6)	6.6 (3.[illegible])	6.8 (3.6)
[illegible] (/[illegible])	1.8 (1.1)	1.8 (1.1)	1.7 (1.2)	1.7 (1.0)
[illegible] (%/[illegible])	50.1 (26.5)	47.5 (25.8)	51.5 (31.4)	52.7 (28.3)
[illegible] 2, [illegible] (S)	*n* = 41	*n* = 3	*n* = 3	*n* = 42
[illegible] (/[illegible])	2.1 (0.6)	2.0 (0.8)	3.3 (0.6)	3.2 (0.7)
[illegible] (/[illegible])	[illegible].1 (2.0)	8.7 (3.4)	[illegible].1 (1.6)	[illegible].0 (2.1)
[illegible] (/[illegible])	3.1 (2.0)	2.[illegible] (1.3)	3.0 (0.7)	3.1 (1.0)
[illegible] (%/[illegible])	73.0 (21.7)	68.5 (27.4)	76.8 (13.4)	77.1 (18.7)
[illegible] 3, [illegible] (S)	*n* = 41	*n* = 38	*n* = 38	*n* = 42
[illegible] (/[illegible])	2.7 (0.8)	2.8 (0.[illegible])	3.4 (0.8)	3.4 (0.8)
[illegible] (/[illegible])	[illegible].7 (2.3)	[illegible].6 (3.0)	[illegible].8 (2.5)	[illegible].7 (2.5)
[illegible] (/[illegible])	3.2 (1.0)	3.5 (1.3)	3.3 (1.1)	3.3 (1.3)
[illegible] (%/[illegible])	78.1 (17.5)	81.2 (26.0)	82.3 (21.[illegible])	82.3 (23.1)
[illegible] 4, [illegible] (S)	*n* = 42	*n* = 38	*n* = 38	*n* = 43
[illegible] (/[illegible])	2.7 (0.8)	3.1 (0.8)	3.7 (0.5)	3.4 (1.1)
[illegible] (/[illegible])	[illegible].8 (2.8)	10.3 (2.[illegible])	10.7 (1.8)	[illegible] (3.1)
[illegible] (/[illegible])	3.3 (1.3)	3.7 (1.2)	3.7 (1.2)	3.3 (1.4)
[illegible] (%/[illegible])	7[illegible].4 (22.5)	86.4 (24.4)	[illegible]1.0 (18.7)	83.2 (28.6)
[illegible] 5, [illegible] (S)	*n* = 42	*n* = 38	*n* = 38	*n* = 42
[illegible] (/[illegible])	2.[illegible] (0.8)	3.2 (0.7)	3.7 (0.8)	3.6 (0.7)
[illegible] (/[illegible])	[illegible] (3.0)	10.8 (2.7)	11.1 (2.7)	11.0 (2.8)
[illegible] (/[illegible])	3.7 (1.4)	4.1 (1.3)	4.1 (1.5)	3.7 (1.2)
[illegible] (%/[illegible])	84.3 (27.1)	[illegible]2.8 (24.[illegible])	[illegible]5.8 (26.[illegible])	[illegible]1.2 (20.1)
[illegible] 6, [illegible] (S)	*n* = 41	*n* = 38	*n* = 38	*n* = 43
[illegible] (/[illegible])	3.0 (0.7)	3.2 (0.7)	3.6 (0.7)	3.6 (0.[illegible])
[illegible] (/[illegible])	10.4 (2.7)	11.2 (2.6)	11.2 (2.4)	10.[illegible] (2.7)
[illegible] (/[illegible])	3.[illegible] (1.6)	4.4 (1.3)	4.3 (1.6)	3.[illegible] (1.7)
[illegible] (%/[illegible])	8[illegible].2 (26.6)	[illegible]7.2 (24.2)	[illegible]7.7 (25.3)	[illegible]3.2 (28.1)

continued

TABLE 11 Total nutrition intake during the first 7 days, 3 weeks, 4 weeks and by 34 weeks of gestational age for all infants randomised (*continued*)

	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible] 7, [illegible] (S)	*n* = 42	*n* = 38	*n* = 38	*n* = 41
[illegible]	3.0 (0.7)	3.1 (0.6)	3.7 (0.6)	3.6 (0.8)
[illegible]	10.5 (2.5)	11.0 (2.4)	11.5 (2.1)	11.2 (2.5)
[illegible]	3. (1.6)	4.3 (1.6)	4.6 (1.7)	4.1 (1.8)
[illegible]	8 .2 (25.2)	4.8 (24.6)	102.1 (23.3)	6.0 (27.6)
[illegible] 3 [illegible] (S)	*n* = 42	*n* = 41	*n* = 40	*n* = 43
[illegible]	61.4 (23.0)	58.8 (2 .5)	70.7 (26.0)	71.2 (2 .7)
[illegible]	238.7 (0.1)	223.7 (10 .8)	248.4 (0.4)	243.0 (103.6)
[illegible]	105.5 (47.8)	.2 (56.2)	10 .4 (48.8)	104.1 (52.8)
[illegible]	2150 (875)	2023 (1057)	2261 (8 3)	21 3 (1003)
[illegible] 4 [illegible] (S)	*n* = 42	*n* = 41	*n* = 40	*n* = 43
[illegible]	85.5 (32.0)	80.4 (42.7)	6.3 (38.1)	8.1 (41.0)
[illegible]	33 .5 (120.8)	313.7 (158.2)	34 .5 (131.0)	346. (144.7)
[illegible]	156.1 (65.8)	143. (80.7)	15 .0 (72.0)	155.2 (76.2)
[illegible]	3105 (11 3)	2871 (1521)	3215 (1308)	3177 (141)
[illegible] 34 [illegible] (S)	*n* = 42	*n* = 41	*n* = 40	*n* = 43
[illegible]	143.7 (55.)	117.6 (57.)	133.5 (51.)	144.6 (47.3)
[illegible]	574.7 (200.8)	481. (228.1)	525.7 (1 6.)	544.8 (185.)
[illegible]	272.0 (8.7)	225.0 (111.2)	237.2 (4.1)	24 .3 (7.0)
[illegible]	5321 (18 0)	4424 (2123)	4772 (1784)	5001 (1768)

[illegible] 1 [illegible] 17.00.

TABLE 12 Nutritional intake over the first 2 weeks for all infants randomised[a]

	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
[illegible], *n* (%)	40 (5.2)	38 (0.5)	38 (2.7)	42 (7.7)
[illegible] (), [illegible] ( )	0.76 (0.42–1.56) *n* = 40	0. 4 (0.21–1.33) *n* = 38	0.68 (0.34–1.44) *n* = 38	0.5 (0.17–1.11) *n* = 42
[illegible], *n* (%)	12 (28.6)	11 (26.2)	16 (3 .0)	13 (30.2)
[illegible] (), [illegible] ( )	0.03 (0.01–0.2) *n* = 12	0.16 (0.04–1.10) *n* = 11	0.47 (0.03–1.00) *n* = 16	0.37 (0.02–1.56) *n* = 13
[illegible], *n* (%)	42 (100.0)	41 (7.6)	40 (7.6)	43 (100.0)
[illegible] ( ), [illegible] ( )	11.0 (8.0–14.0) *n* = 42	12.0 (.0–14.0) *n* = 41	11.0 (.0–13.0) *n* = 40	12.0 (.0–14.0) *n* = 43
[illegible] ( )				
[illegible] ()	1.02 (0.74–1.2) *n* = 42	0. 3 (0.70–1.30) *n* = 41	0. 3 (0.81–1.18) *n* = 40	1.04 (0.81–1.36) *n* = 43
[illegible] ()	0.13 (0.0 –0.17) *n* = 42	0.11 (0.08–0.17) *n* = 41	0.12 (0.10–0.15) *n* = 40	0.13 (0.0 –0.18) *n* = 43
[illegible] ( )	22.4 (16.0–28.4) *n* = 42	20. (15.3–28.4) *n* = 41	25. (22.6–32.5) *n* = 40	2 .5 (23.2–37.2) *n* = 43
[illegible] ( )	76.6 (57.7– 6.1) *n* = 42	6 .3 (53.1– 6.6) *n* = 41	6 .8 (61.1–87.8) *n* = 40	7 .5 (62.7–100.4) *n* = 43
[illegible] ( )	23.6 (16.7–31.6) *n* = 42	21.0 (15.1–31.4) *n* = 41	21.4 (17.5–27.7) *n* = 40	24.6 (16.7–31.8) *n* = 43
[illegible], *n* (%)	3 (7.1)	1 (2.4)	1 (2.4)	3 (7.0)
[illegible] ( ), [illegible] ( )	4.0 (3.5–4.0) *n* = 3	1.0 (1.0–1.0) *n* = 1	1.0 (1.0–1.0) *n* = 1	2.0 (1.5–5.0) *n* = 3
[illegible] ( )				
[illegible] ()	0.46 (0.40–0.47) *n* = 3	0.02 (0.02–0.02) *n* = 1	0.07 (0.07–0.07) *n* = 1	0.37 (0.20–0.44) *n* = 3
[illegible] ()	0.02 (0.01–0.04) *n* = 3	0.00 (0.00–0.00) *n* = 1	0.00 (0.00–0.00) *n* = 1	0.03 (0.01–0.03) *n* = 3
[illegible] ( )	1.34 (1.17–1.54) *n* = 3	0.07 (0.07–0.07) *n* = 1	0.15 (0.15–0.15) *n* = 1	1.04 (0.57–1.21) *n* = 3
[illegible] ( )	42.57 (40.82–45.) *n* = 3	2.47 (2.47–2.47) *n* = 1	3.35 (3.35–3.35) *n* = 1	2 .75 (17.04–35.48) *n* = 3
[illegible] ( )	4.40 (2.20–7. 0) *n* = 3	0.30 (0.30–0.30) *n* = 1	0.53 (0.53–0.53) *n* = 1	4.44 (2.61–5.85) *n* = 3
[illegible] ( )				
[illegible] ()	1.04 (0.81–1.2) *n* = 42	0. 3 (0.70–10.30) *n* = 41	0. 4 (0.81–1.18) *n* = 40	1.04 (0.81–1.36) *n* = 43
[illegible] ()	0.13 (0.0 –0.17) *n* = 42	0.11 (0.08–0.17) *n* = 41	0.12 (0.10–0.15) *n* = 40	0.13 (0.0 –0.18) *n* = 43
[illegible] ( )	22.4 (16.0–28.4) *n* = 42	20. (15.3–28.4) *n* = 41	25. (22.6–32.5) *n* = 40	2 .5 (23.2–37.2) *n* = 43
[illegible] ( )	78.0 (61.8– 6.1) *n* = 42	6 .3 (53.1– 6.6) *n* = 41	70.3 (61.1–87.8) *n* = 40	7 .5 (62.7–100.4) *n* = 43
[illegible] ( )	23.6 (16.8–31.6) *n* = 42	21.0 (15.1–31.4) *n* = 41	21.4 (17.5–27.7) *n* = 40	24.6 (16.7–31.8) *n* = 43

[illegible] ([illegible]).

TABLE 13 Nutritional intake during the study period for all infants randomised[a]

	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)
G[illegible] ( )				
[illegible]	15.2 (5.3 –50.2) *n* = 42	18.1 (7.20–54.0) *n* = 41	11.8 (5.23–45.7) *n* = 40	22.2 (7. –55.5) *n* = 43
[illegible], *n* (%)	11 (26.2)	12 (28.6)	5 (12.2)	10 (23.3)
[illegible] ( )				
[illegible]	17.54 (8. 6–24.4) *n* = 14	7.46 (5.12–18.4) *n* = 14	12.18 (.01–42.7) *n* =	10.01 (5.44–22.5) *n* = 14
[illegible]	. 7 (6.7 –11.73) *n* = 8	2.73 (1.47–4.88) *n* = 8	2. 3 (1.73–8.24) *n* = 8	3.72 (1.64–7.14) *n* = 10
[illegible], *n* (%)	15 (35.7)	12 (28.6)	13 (31.7)	17 (3 .5)
[illegible] ( ), [illegible] ( )	0.38 (0.08–1.07) *n* = 15	0.30 (0.02–0.47) *n* = 12	0.38 (0.05–1.10) *n* = 13	0.1 (0.03–0.36) *n* = 17
[illegible], *n* (%)	41 (7.6)	38 (0.5)	38 (2.7)	43 (100.0)
[illegible] ( ), [illegible] ( )				
[illegible]	0.72 (0.45–0.88) *n* = 41	0.61 (0.43–0.81) *n* = 38	0.57 (0.30–0.81) *n* = 38	0.63 (0.26–0.8) *n* = 43
[illegible]	1. 2 (0.38–4.82) *n* = 8	4.01 (1.83–5.08) *n* = 8	1.7 (0.44–4.51) *n* = 8	2.78 (0.70–4.50) *n* = 8
[illegible]	8.05 (4.50–13.2) *n* = 41	7.16 (1. 4–12.1) *n* = 38	6.74 (1.27–12.1) *n* = 38	7.61 (1.73–15.7) *n* = 43
[illegible] ( )	13.0 (10.0–24.0) *n* = 23	23.0 (14.5–41.8) *n* = 12	14.0 (1.0–2 .0) *n* = 17	27.0 (13.0–44.0) *n* = 17
[illegible], *n* (%)	30 (71.4)	23 (54.8)	2 (70.7)	2 (67.4)
[illegible] ( ), [illegible] ( )				
[illegible]	0.02 (0.01–0.13) *n* = 10	0.24 (0.02–0.52) *n* = 10	0.28 (0.04–0.60) *n* = 15	0.30 (0.04–0.3) *n* = 14
[illegible]	2.05 (0.44–3.60) *n* = 6	2.0 (0.00–4.35) *n* = 4	0.78 (0.00–2.12) *n* = 7	2.30 (0. 5–5.06) *n* = 6
[illegible]	5.86 (1.22–10.87) *n* = 30	6.3 (0.41– .36) *n* = 23	8.44 (2.21–13.04) *n* = 2	6.70 (3.86–12.63) *n* = 2
[illegible], *n* (%)	42 (100.0)	41 (7.6)	40 (7.6)	43 (100.0)
[illegible] ( ), [illegible] ( )	11.0 (8.00–16.8) *n* = 42	12.0 (.00–17.0) *n* = 41	11.0 (.75–13.2) *n* = 40	12.0 (.00–17.0) *n* = 43
[illegible]				
[illegible]	1.04 (0.77–1.56) *n* = 42	0. 7 (0.71–1.3) *n* = 41	0. 5 (0.81–1.33) *n* = 40	1.1 (0.86–1.56) *n* = 43
[illegible]	0.13 (0.0 –0.1) *n* = 42	0.13 (0.08–0.18) *n* = 41	0.12 (0.10–0.16) *n* = 40	0.14 (0.10–0.1) *n* = 43
[illegible] ( )				
[illegible]	22.8 (16. –34.4) *n* = 42	21.6 (15.3–30.5) *n* = 41	26.7 (23.2–37.5) *n* = 40	33.5 (24.0–42.5) *n* = 43
[illegible]	78.0 (57.7–116.0) *n* = 42	72.7 (55.0–104.8) *n* = 41	71. (62.6–101.3) *n* = 40	0.4 (64.8–114.6) *n* = 43
[illegible]	23. (16.7–35.7) *n* = 42	23.6 (15.1–33.0) *n* = 41	21.6 (18.0–2 .5) *n* = 40	25.0 (18.6–35.0) *n* = 43
[illegible], *n* (%)	10 (23.8)	8 (1 .0)	8 (1 .5)	10 (23.3)

TABLE 13 Nutritional intake during the study period for all infants randomised[a] (*continued*)

	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/Intralipid (*N* = 41)	Imm-RDI/SMOFlipid (*N* = 43)
[illegible]	5.5 (3.25–1[illegible].8) *n* = 10	22.0 (14.50–28.5) *n* = 8	28.5 ([illegible].50–58.5) *n* = 8	12.0 (3.00–15.8) *n* = 10
[illegible]				
[illegible]	0.47 (0.3[illegible]–2.44) *n* = 10	2.12 (1.8[illegible]–2.37) *n* = 8	2.[illegible]1 (0.87–[illegible].50) *n* = 8	1.23 (0.47–2.44) *n* = 10
[illegible]	0.06 (0.02–0.26) *n* = 10	0.33 (0.32–0.3[illegible]) *n* = 8	0.38 (0.13–1.40) *n* = 8	0.16 (0.05–0.26) *n* = 10
[illegible]				
[illegible]	0.0 (0.0–0.00) *n* = 10	0.0 (0.0–0.00) *n* = 8	0.0 (0.0–0.04) *n* = 8	0.0 (0.0–0.07) *n* = 10
[illegible]	0.0 (0.0–0.00) *n* = 10	0.0 (0.0–0.00) *n* = 8	0.0 (0.0–0.84) *n* = 8	0.0 (0.0–3.25) *n* = 10
[illegible]	0.0 (0.0–0.00) *n* = 10	0.0 (0.0–0.00) *n* = 8	0.0 (0.0–0.13) *n* = 8	0.0 (0.0–0.5[illegible]) *n* = 10
[illegible]				
[illegible]	1.65 (1.34–6.54) *n* = 10	7.32 (5.60–7.66) *n* = 8	10.76 (4.60–31.[illegible]5) *n* = 8	3.0[illegible] (0.3[illegible]–4.28) *n* = 10
[illegible]	4[illegible].4 (41.1–220.6) *n* = 10	222.7 (188.6–265.4) *n* = 8	338.7 (166.7–1136.4) *n* = 8	108.6 (11.3–146.3) *n* = 10
[illegible]	10.5 (4.04–46.5) *n* = 10	58.8 (56.76–6[illegible].1) *n* = 8	66.0 (23.68–247.1) *n* = 8	28.3 (8.78–46.4) *n* = 10
[illegible]				
[illegible]	1.12 (0.85–1.85) *n* = 42	1.30 (0.83–1.64) *n* = 41	1.06 (0.87–1.48) *n* = 40	1.38 (0.[illegible]5–2.04) *n* = 43
[illegible]	0.17 (0.10–0.24) *n* = 42	0.16 (0.10–0.21) *n* = 41	0.13 (0.11–0.20) *n* = 40	0.18 (0.12–0.24) *n* = 43
[illegible]				
[illegible]	22.8 (16.[illegible]–34.4) *n* = 42	21.6 (15.3–30.5) *n* = 41	26.7 (23.2–37.5) *n* = 40	33.5 (24.0–42.5) *n* = 43
[illegible]	78.0 (60.[illegible]–116.0) *n* = 42	72.7 (55.0–104.8) *n* = 41	71.[illegible] (62.6–101.3) *n* = 40	[illegible]0.4 (66.3–114.6) *n* = 43
[illegible]	23.[illegible] (16.8–35.7) *n* = 42	23.6 (15.1–33.0) *n* = 41	21.6 (18.0–2[illegible].5) *n* = 40	25.0 (18.6–35.0) *n* = 43
[illegible]				
[illegible]	23.7 (18.0–36.4) *n* = 42	23.[illegible] (17.8–31.6) *n* = 41	2[illegible].5 (24.1–38.4) *n* = 40	33.5 (25.2–42.5) *n* = 43
[illegible]	87.8 (64.5–13[illegible].6) *n* = 42	[illegible]4.8 (64.0–136.5) *n* = 41	81.0 (65.1–113.4) *n* = 40	101.4 (70.8–14[illegible].7) *n* = 43
[illegible]	31.3 (18.8–43.6) *n* = 42	28.2 (1[illegible].0–37.4) *n* = 41	23.2 (1[illegible].3–36.4) *n* = 40	32.0 (22.6–44.1) *n* = 43
[illegible] 34 [illegible]				
[illegible]	138.2 (10[illegible]–170.7) *n* = 42	11[illegible].0 ([illegible]1.1–161.0) *n* = 41	124.8 (103.1–175.3) *n* = 40	148.3 (122.1–170.7) *n* = 43
[illegible]	565.6 (446.6–756.7) *n* = 42	557.[illegible] (338.4–673.2) *n* = 41	508.0 (3[illegible].7–682.4) *n* = 40	5[illegible]0.4 (440.4–680.[illegible]) *n* = 43
[illegible]	272.8 (217.2–346.5) *n* = 42	246.1 (157.6–306.1) *n* = 41	235.7 (182.7–2[illegible]5.7) *n* = 40	261.5 (201.[illegible]–313.0) *n* = 43

[illegible]

TABLE 14 Nutritional intake over first 2 weeks for all infants completing MRI assessment[a]

	Inc-AA/Intralipid (*N* = 34)	Inc-AA/ SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/SMOFlipid (*N* = 37)
[illegible], *n* (%)	32 (4.1)	27 (6.4)	33 (7.1)	36 (7.3)
[illegible], [illegible]	0.7 (0.60–1.63) *n* = 32	0. 7 (0.54–1.62) *n* = 27	0.77 (0.42–1.54) *n* = 33	0.76 (0.2 –1.14) *n* = 36
[illegible], *n* (%)	10 (2 .4)	(32.1)	14 (41.2)	11 (2 .7)
[illegible], [illegible]	0.03 (0.01–0.1) *n* = 10	0.26 (0.0 –1.11) *n* =	0.35 (0.03–1.12) *n* = 14	0.37 (0.05–1.32) *n* = 11
[illegible], *n* (%)	34 (100.0)	28 (100.0)	34 (100.0)	37 (100.0)
[illegible], [illegible]	11.0 (8.00–14.0) *n* = 34	12.0 (.00–14.0) *n* = 28	11.0 (.25–13.0) *n* = 34	12.0 (.00–14.0) *n* = 37
[illegible]				
[illegible]	1.02 (0.74–1.30) *n* = 34	1.03 (0.81–1.33) *n* = 28	0. 4 (0.86–1.21) *n* = 34	1.07 (0.81–1.3) *n* = 37
[illegible]	0.13 (0.0 –0.18) *n* = 34	0.13 (0.10–0.18) *n* = 28	0.12 (0.10–0.16) *n* = 34	0.13 (0.0 –0.18) *n* = 37
[illegible]	22.4 (16.0–28.) *n* = 34	22.3 (17.6–2 .1) *n* = 28	26.2 (23. –33.2) *n* = 34	31.0 (23.0–37.) *n* = 37
[illegible]	76.6 (57.7– 7.2) *n* = 34	7 .1 (5 .7–100.1) *n* = 28	70.6 (64.4–8 .6) *n* = 34	83.7 (62.0–102.1) *n* = 37
[illegible]	24.3 (17.0–32.2) *n* = 34	24.5 (18.1–32.2) *n* = 28	21.7 (18.1–28.4) *n* = 34	25.0 (17.1–32.) *n* = 37
[illegible], *n* (%)	2 (5.)	1 (3.6)	1 (2.)	2 (5.4)
[illegible]	4.0 (4.0–4.0) *n* = 2	1.0 (1.0–1.0) *n* = 1	1.0 (1.0–1.0) *n* = 1	5.0 (3.5–6.5) *n* = 2
[illegible]				
[illegible]	0.47 (0.47–0.48) *n* = 2	0.02 (0.02–0.02) *n* = 1	0.07 (0.07–0.07) *n* = 1	0.44 (0.41–0.47) *n* = 2
[illegible]	0.01 (0.01–0.02) *n* = 2	0.00 (0.00–0.00) *n* = 1	0.00 (0.00–0.00) *n* = 1	0.03 (0.03–0.04) *n* = 2
[illegible]	1.37 (1.18–1.55) *n* = 2	0.07 (0.07–0.07) *n* = 1	0.15 (0.15–0.15) *n* = 1	1.21 (1.12–1.2) *n* = 2
[illegible]	45. (44.28–47.6) *n* = 2	2.47 (2.47–2.47) *n* = 1	3.35 (3.35–3.35) *n* = 1	35.48 (32.62–38.34) *n* = 2
[illegible]	2.20 (1.10–3.30) *n* = 2	0.30 (0.30–0.30) *n* = 1	0.53 (0.53–0.53) *n* = 1	5.85 (5.14–6.56) *n* = 2
[illegible]				
[illegible]	1.04 (0.82–1.30) *n* = 34	1.03 (0.81–1.33) *n* = 28	0. 5 (0.86–1.21) *n* = 34	1.07 (0.81–1.3) *n* = 37
[illegible]	0.13 (0.0 –0.18) *n* = 34	0.13 (0.10–0.18) *n* = 28	0.12 (0.10–0.16) *n* = 34	0.13 (0.0 –0.18) *n* = 37
[illegible]	22.4 (16.0–28.) *n* = 34	22.3 (17.6–2 .1) *n* = 28	26.2 (23. –33.2) *n* = 34	31.0 (23.0–37.) *n* = 37
[illegible]	78.0 (63.0– 7.2) *n* = 34	7 .1 (60.5–100.1) *n* = 28	71.7 (64.4–8 .6) *n* = 34	83.7 (62.0–102.1) *n* = 37
[illegible]	24.3 (17.0–32.2) *n* = 34	24.5 (18.4–32.2) *n* = 28	21.7 (18.1–28.4) *n* = 34	25.0 (17.1–32.) *n* = 37

[illegible]

TABLE 15 Nutritional intake during the study period for all infants completing MRI assessment[a]

	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/SMOFlipid (*N* = 37)
G [illegible] ( )				
[illegible] ( ), [illegible] ( )	.27 (4.56–54.8) *n* = 34	23.64 (7.04–75.1) *n* = 28	11.81 (5.68–25.) *n* = 34	22.20 (8.8 –53.4) *n* = 37
[illegible]), *n* (%)	7 (20.6)	6 (21.4)	4 (11.8)	7 (18.)
[illegible] ( )				
[illegible]	20. 3 (11.81–34.2) *n* = 10	11.13 (5.00–22.6) *n* = 11	.85 (8.87–13.5) *n* = 7	10.01 (5.44–22.5) *n* = 14
[illegible]	10.38 (6.45–12.2) *n* = 7	3.71 (1.62–5.58) *n* = 7	2.18 (1.46–5.00) *n* = 7	4.1 (1.60–7.85) *n* =
[illegible] *n* (%)	11 (32.4)	(32.1)	12 (35.3)	15 (40.5)
[illegible]), [illegible] ( )	0.38 (0.08–1.07) *n* = 11	0.27 (0.02–0.44) *n* =	0.24 (0.04–1.15) *n* = 12	0.1 (0.03–0.84) *n* = 15
[illegible] *n* (%)	33 (7.1)	27 (6.4)	33 (7.1)	37 (100.0)
[illegible] (), [illegible] ( )				
[illegible]	0.73 (0.57–0.88) *n* = 33	0.62 (0.45–0.83) *n* = 27	0.62 (0.32–0.82) *n* = 33	0.65 (0.36–0. 0) *n* = 37
[illegible]	1.75 (0.33–4.46) *n* = 5	4.16 (2.86–5.13) *n* = 7	1.7 (0.50–3.16) *n* = 6	2.78 (0.70–4.50) *n* = 8
[illegible]	8.46 (5. 0–14.6) *n* = 33	7.86 (2.7 –13.5) *n* = 27	5. 7 (1.53–12.3) *n* = 33	8.86 (3.32–15.) *n* = 37
[illegible] ( )	13.0 (10.0–21.0) *n* = 21	20.0 (16.0–36.0) *n* =	13.0 (1.0–28.2) *n* = 16	25.5 (13.0–45.0) *n* = 16
[illegible] *n* (%)	25 (73.5)	1 (67.)	25 (73.5)	26 (70.3)
[illegible] (), [illegible] ( )				
[illegible]	0.02 (0.00–0.16) *n* =	0.41 (0.13–0.53) *n* = 8	0.13 (0.04–0.66) *n* = 13	0.28 (0.05–0.38) *n* = 11
[illegible]	2.34 (1.76–4.02) *n* = 5	2.0 (0.00–4.35) *n* = 4	0.78 (0.00–3.45) *n* = 5	2.30 (0. 5–5.06) *n* = 6
[illegible]	2.81 (0. –14.37) *n* = 25	8.04 (2. 6– . 3) *n* = 1	8.44 (2.21–13.04) *n* = 25	7.26 (3. 0–12.61) *n* = 26
[illegible] ([illegible]), *n* (%)	34 (100.0)	28 (100.0)	34 (100.0)	37 (100.0)
[illegible] ( ), [illegible] ( )	11.0 (8.0–16.0) *n* = 34	12.5 (.0–16.0) *n* = 28	11.0 (10.0–13.0) *n* = 34	13.0 (.0–17.0) *n* = 37

continued

TABLE 15 Nutritional intake during the study period for all infants completing MRI assessment[a] (*continued*)

	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/ SMOFlipid (*N* = 37)
[illegible]				
[illegible]	1.04 (0.77–1.56) *n* = 34	1.06 (0.83–1.3) *n* = 28	0. 6 (0.86–1.32) *n* = 34	1.1 (0.82–1.57) *n* = 37
[illegible]	0.14 (0.0 –0.1) *n* = 34	0.13 (0.10–0.1) *n* = 28	0.12 (0.10–0.16) *n* = 34	0.14 (0.10–0.20) *n* = 37
[illegible]				
[illegible]	22.8 (16. –34.4) *n* = 34	23.0 (18.2–30.6) *n* = 28	27.2 (23. –36.) *n* = 34	33.5 (23.5–42.5) *n* = 37
[illegible]	78.0 (57.7–118.5) *n* = 34	81.6 (62.1–105.2) *n* = 28	73.4 (64.4– .6) *n* = 34	0.4 (63.4–114.6) *n* = 37
[illegible]	25.0 (17.0–35.7) *n* = 34	24. (18.1–33.) *n* = 28	21.7 (1 .1–28.4) *n* = 34	25.0 (1 .0–35.6) *n* = 37
[illegible] *n* (%)	6 (17.6)	7 (25.0)	6 (17.6)	(24.3)
[illegible]	13.5 (4.0–27.5) *n* = 6	1 .0 (13.0–26.0) *n* = 7	43.5 (25.8–6 .5) *n* = 6	12.0 (3.0–16.0) *n* =
[illegible]				
[illegible]	1.77 (0.40–3.76) *n* = 6	2.13 (1.86–2.48) *n* = 7	6.26 (2.52–10.83) *n* = 6	1.24 (0.74–2.76) *n* =
[illegible]	0.18 (0.02–0.58) *n* = 6	0.33 (0.32–0.35) *n* = 7	0. 0 (0.32–1.58) *n* = 6	0.17 (0.07–0.2) *n* =
[illegible]				
[illegible]	0.0 (0.0–0.00) *n* = 6	0.0 (0.0–0.00) *n* = 7	0.0 (0.0–0.12) *n* = 6	0.0 (0.0–0.00) *n* =
[illegible]	0.0 (0.0–0.00) *n* = 6	0.0 (0.0–0.00) *n* = 7	0.0 (0.0–2.51) *n* = 6	0.0 (0.0–0.00) *n* =
[illegible]	0.0 (0.0–0.0) *n* = 6	0.0 (0.0–0.0) *n* = 7	0.0 (0.0–0.4) *n* = 6	0.0 (0.0–0.0) *n* =
[illegible]				
[illegible]	4.88 (1.44–12.63) *n* = 6	7.44 (4.66–7.6) *n* = 7	1 .86 (6.68–37.40) *n* = 6	3. 8 (1.07–4.28) *n* =
[illegible]	15 .4 (47. –431.8) *n* = 6	242.2 (186. –267.0) *n* = 7	701.5 (23 .8–133 .7) *n* = 6	13 .6 (30.7–147.6) *n* =
[illegible]	31.2 (2. 6–101.7) *n* = 6	58.2 (56.47–62.2) *n* = 7	15 .0 (55.66–278.5) *n* = 6	30.4 (13.16–50.8) *n* =
[illegible]				
[illegible]	1.11 (0.85–1.85) *n* = 34	1.34 (0. 6–1.80) *n* = 28	1.12 (0.8 –1.43) *n* = 34	1.53 (0. 7–2.05) *n* = 37
[illegible]	0.17 (0.10–0.25) *n* = 34	0.18 (0.13–0.25) *n* = 28	0.13 (0.11–0.20) *n* = 34	0.18 (0.13–0.25) *n* = 37

TABLE 15 Nutritional intake during the study period for all infants completing MRI assessment[a] (*continued*)

	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/SMOFlipid (*N* = 37)
[illegible]				
[illegible]	22.8 (16. –34.4) *n* = 34	23.0 (18.2–30.6) *n* = 28	27.2 (23. –36.) *n* = 34	33.5 (23.5–42.5) *n* = 37
[illegible]	78.0 (61.2–118.5) *n* = 34	81.6 (62.1–105.2) *n* = 28	73.4 (64.4– .6) *n* = 34	2.7 (66.4–114.6) *n* = 37
[illegible]	25.0 (17.0–35.7) *n* = 34	24. (18.4–33.) *n* = 28	21.7 (1 .1–28.4) *n* = 34	25.0 (1 .0–35.6) *n* = 37
[illegible]				
[illegible]	23.7 (18.0–36.5) *n* = 34	26.1 (20.5–31.6) *n* = 28	30.3 (24. –37.) *n* = 34	34.4 (25.8–42.5) *n* = 37
[illegible]	85.5 (64.5–13 .6) *n* = 34	101. (72.2–145.1) *n* = 28	83.5 (67.2–110.6) *n* = 34	112.0 (71. –152.7) *n* = 37
[illegible]	30.3 (18.8–45.5) *n* = 34	31.8 (23.5–46.0) *n* = 28	23.6 (20.2–35.7) *n* = 34	32. (22.8–45.6) *n* = 37
[illegible] 34 [illegible]				
[illegible]	138.2 (115.8–185.8) *n* = 34	144.3 (115.5–165.4) *n* = 28	124.2 (104.5–176.6) *n* = 34	154.7 (133.1–171.7) *n* = 37
[illegible]	565.6 (48 .3–767.7) *n* = 34	5 6.2 (476.4–703.0) *n* = 28	508.0 (402.8–684.2) *n* = 34	607.7 (508. –6 0.0) *n* = 37
[illegible]	284.3 (235.7–370.6) *n* = 34	282.2 (233.8–320.1) *n* = 28	245.2 (185.1–2 5.2) *n* = 34	27 .1 (213.3–323.2) *n* = 37

[illegible]

[illegible] 24 [illegible] *Tables 16–18* [illegible] *Tables 16* [illegible] *18* [illegible] *Table 17* [illegible]

[illegible] >7 [illegible] (50% [illegible] 47.6% [illegible] -AA/ [illegible] -AA/S [illegible] 70.7% [illegible] 7 .1% [illegible] - / [illegible] - /S [illegible] $p < 0.01$) [illegible] >10 [illegible] (14.3% [illegible] 21.4% [illegible] -AA/ [illegible] -AA/S [illegible] 43. % [illegible] 53.5% [illegible] - / [illegible] - /S [illegible] $p < 0.01$).

[illegible] ($p = 0.05$) [illegible] (*Figure 7*).

[illegible] -A [illegible] -AA [illegible] (1. , 5% –108. 111. $p = 0.$ 8). [illegible] 20% [illegible] 20% [illegible] 1.1, 5% 0.8 1.6 $p = 0.58$). [illegible] *Table 19*. [illegible] *Table 20*.

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

TABLE 16 Safety data: summary of laboratory AEs by treatment for all infants randomised[a]

SpAE	Inc-AA/Intralipid, ($N = 42$)	Inc-AA/SMOFlipid ($N = 42$)	Imm-RDI/ Intralipid ($N = 41$)	Imm-RDI/ SMOFlipid ($N = 43$)	*p*-value for amino acid	*p*-value for lipid
G[illegible], *n* (%)						
[illegible] (<2.6[illegible])	12 (28.6)	1[illegible] (45.2)	15 (36.6)	16 (37.2)	1.0	0.32
[illegible] (>15[illegible])	8 (1[illegible].0)	11 (26.2)	3 (7.3)	7 (16.3)	0.10	0.25
[illegible] 24 [illegible], *n* (%)						
>15[illegible]	5 (11.[illegible])	3 (7.1)	5 (12.2)	8 (18.6)	0.35	1.0
[illegible], *n* (%)						
>150[illegible]	30 (71.4)	27 (64.3)	26 (63.4)	31 (72.1)	1.0	1.0
[illegible], *n* (%)						
>40[illegible]	6 (14.3)	4 ([illegible].5)	3 (7.3)	4 ([illegible].3)	0.61	0.[illegible]6
[illegible], *n* (%)						
>6[illegible]	0 (0)	2 (4.8)	1 (2.4)	0 (0)	0.56	0.57
>10[illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
>2.5[illegible]	15 (35.7)	13 (31.0)	14 (34.1)	12 (27.[illegible])	0.87	0.55
>5[illegible]	2 (4.8)	2 (4.8)	1 (2.4)	2 (4.7)	0.70	0.72
S[illegible], *n* (%)						
[illegible] (<131[illegible])	[illegible] (21.4)	7 (16.7)	10 (24.4)	[illegible] (20.[illegible])	0.70	0.65
[illegible] (>150[illegible])	5 (11.[illegible])	10 (23.8)	4 ([illegible].8)	5 (11.6)	0.27	0.3
[illegible], *n* (%)						
[illegible] (<3.2[illegible])	5 (11.[illegible])	6 (14.3)	11 (26.8)	7 (16.3)	0.22	0.63
[illegible] (>[illegible])	0 (0)	0 (0)	0 (0)	0 (0)	[illegible]	[illegible]
[illegible], *n* (%)						
[illegible] (<1.5[illegible])	17 (40.5)	12 (28.6)	14 (34.1)	1[illegible] (44.2)	0.63	1.0
[illegible] (>3[illegible])	4 ([illegible].5)	5 (11.[illegible])	5 (12.2)	4 ([illegible].3)	1.0	1.0
[illegible], *n* (%)						
[illegible] (<1[illegible])	0 (0)	1 (2.4)	0 (0)	2 (4.7)	0.56	0.08
[illegible] (>3[illegible])	0 (0)	0 (0)	3 (7.3)	2 (4.7)	0.02	0.63
[illegible], *n* (%)						
[illegible] (<1.5[illegible])	13 (31.0)	11 (26.2)	5 (12.2)	8 (18.6)	0.15	0.55
[illegible] (>7[illegible])	21 (50.0)	20 (47.6)	2[illegible] (70.7)	34 (7[illegible].1)	<0.01	0.78
[illegible] (>10[illegible])	6 (14.3)	[illegible] (21.4)	18 (43.[illegible])	23 (53.5)	<0.01	0.30
[illegible], *n* (%)						
>170[illegible]	0 (0)	0 (0)	0 (0)	3 (7.0)	0.08	0.08
[illegible], *n* (%)						
>60[illegible]	5 (11.[illegible])	2 (4.8)	4 ([illegible].8)	4 ([illegible].3)	1.0	0.56

TABLE 16 Safety data: summary of laboratory AEs by treatment for all infants randomised[a] (*continued*)

SpAE	Inc-AA/Intralipid, (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/ Intralipid (*N* = 41)	Imm-RDI/ SMOFlipid (*N* = 43)	*p*-value for amino acid	*p*-value for lipid
[illegible], *n* (%)						
< 8 [illegible]	0 (0)	0 (0)	0 (0)	0 (0)	[illegible]	[illegible]
[illegible], *n* (%)						
< 2 [illegible]	0 (0)	0 (0)	0 (0)	0 (0)	[illegible]	[illegible]
[illegible], *n* (%)						
> 30 [illegible]	0 (0)	0 (0)	0 (0)	0 (0)	[illegible]	[illegible]
[illegible], *n* (%)						
> 0.4 [illegible]	0 (0)	0 (0)	0 (0)	0 (0)	[illegible]	[illegible]
[illegible], *n* (%)						
< 20 [illegible]	0 (0)	1 (2.4)	0 (0)	0 (0)	0.32	0.32

[illegible]

TABLE 17 Safety data: summary of laboratory AEs by treatment for all infants completing MRI assessment

SpAE	Inc-AA/Intralipid, (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/ Intralipid (*N* = 34)	Imm-RDI/ SMOFlipid (*N* = 37)	*p*-value for amino acid	*p*-value for lipid
G[illegible], *n* (%)						
[illegible] (< 2.6 [illegible])	8 (23.5)	12 (42.[illegible])	13 (38.2)	14 (37.8)	1.0	0.32
[illegible] (> 15 [illegible])	6 (17.6)	5 (17.[illegible])	3 (8.8)	5 (13.5)	0.1	0.25
[illegible] 24 [illegible], *n* (%)						
> 15 [illegible]	2 (5.[illegible])	0 (0.0)	2 (5.[illegible])	6 (16.2)	0.35	1.0
[illegible], *n* (%)						
> 150 [illegible]	24 (70.6)	21 (75.0)	23 (67.6)	28 (75.7)	1.0	1.0
[illegible], *n* (%)						
> 40 [illegible]	4 (11.8)	3 (10.7)	2 (5.[illegible])	3 (8.1)	0.61	0.[illegible]6
[illegible], *n* (%)						
> 6 [illegible]	0 (0.0)	1 (3.6)	1 (2.[illegible])	0 (0.0)	0.56	0.57
> 10 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
> 2.5 [illegible]	10 (2[illegible].4)	7 (25.0)	11 (32.4)	10 (27.0)	0.87	0.55
> 5 [illegible]	2 (5.[illegible])	0 (0.0)	1 (2.[illegible])	2 (5.4)	0.7	0.72

continued

TABLE 17 Safety data: summary of laboratory AEs by treatment for all infants completing MRI assessment (*continued*)

SpAE	Inc-AA/Intralipid, ($N = 34$)	Inc-AA/SMOFlipid ($N = 28$)	Imm-RDI/ Intralipid ($N = 34$)	Imm-RDI/ SMOFlipid ($N = 37$)	*p*-value for amino acid	*p*-value for lipid
[illegible], *n* (%)						
[illegible] (< 131 [illegible])	7 (20.6)	3 (10.7)	(26.5)	7 (18.)	0.7	0.65
[illegible] (> 150 [illegible])	3 (8.8)	3 (10.7)	4 (11.8)	4 (10.8)	0.27	0.3
[illegible], *n* (%)						
[illegible] (< 3.2 [illegible])	2 (5.)	4 (14.3)	(26.5)	6 (16.2)	0.22	0.63
[illegible] (> [illegible])	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
[illegible] (< 1.5 [illegible])	12 (35.3)	8 (28.6)	13 (38.2)	17 (45.)	0.63	1.0
[illegible] (> 3 [illegible])	4 (11.8)	3 (10.7)	4 (11.8)	3 (8.1)	1.0	1.0
[illegible], *n* (%)						
[illegible] (< 1 [illegible])	0 (0.0)	0 (0.0)	0 (0.0)	2 (5.4)	0.56	0.08
[illegible] (> 3 [illegible])	0 (0.0)	0 (0.0)	3 (8.8)	1 (2.7)	0.02	0.63
[illegible], *n* (%)						
[illegible] (< 1.5 [illegible])	10 (2 .4)	10 (35.7)	5 (14.7)	7 (18.)	0.15	0.55
[illegible] (> 7 [illegible])	14 (41.2)	14 (50.0)	25 (73.5)	2 (78.4)	< 0.01	0.78
[illegible] (> 10 [illegible])	1 (2.)	4 (14.3)	16 (47.1)	18 (48.6)	< 0.01	0.3
[illegible], *n* (%)						
> 170 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	2 (5.4)	0.08	0.08
[illegible], *n* (%)						
> 60 [illegible]	3 (8.8)	2 (7.1)	3 (8.8)	2 (5.4)	1.0	0.56
[illegible], *n* (%)						
< 8 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
< 2 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
> 30 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
> 0.4 [illegible]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	[illegible]	[illegible]
[illegible], *n* (%)						
< 20 [illegible]	0 (0.0)	1 (3.6)	0 (0.0)	0 (0.0)	0.32	0.32

[illegible]

TABLE 18 Safety data: summary of SAEs by treatment[a]

Variable	Inc-AA/Intralipid (*N* = 42)	Inc-AA/SMOFlipid (*N* = 42)	Imm-RDI/Intralipid (*N* = 41)	Imm-RDI/SMOFlipid (*N* = 43)
[illegible] SA, *n* (%)	7 (16.7)	12 (28.6)	7 (17.1)	(20.)
SA [illegible], *n* (%)				
[illegible], *n* (%)	4 (.5)	7 (16.7)	2 (4.)	3 (7.0)
[illegible], *n* (%)	3 (7.1)	3 (7.1)	4 (.8)	4 (.3)
[illegible], *n* (%)	2 (4.8)	2 (4.8)	1 (2.4)	3 (7.0)
[illegible], *n* (%)	0 (0.0)	1 (2.4)	0 (0.0)	1 (2.3)
Se[illegible] ([illegible] SA [illegible]), *n* (%)	2 (4.8)	6 (14.3)	1 (2.4)	1 (2.3)
[illegible], *n* (%)	3 (7.1)	4 (.5)	1 (2.4)	4 (.3)

[illegible] SA [illegible] SA [illegible].
[illegible] SA.
G[illegible]

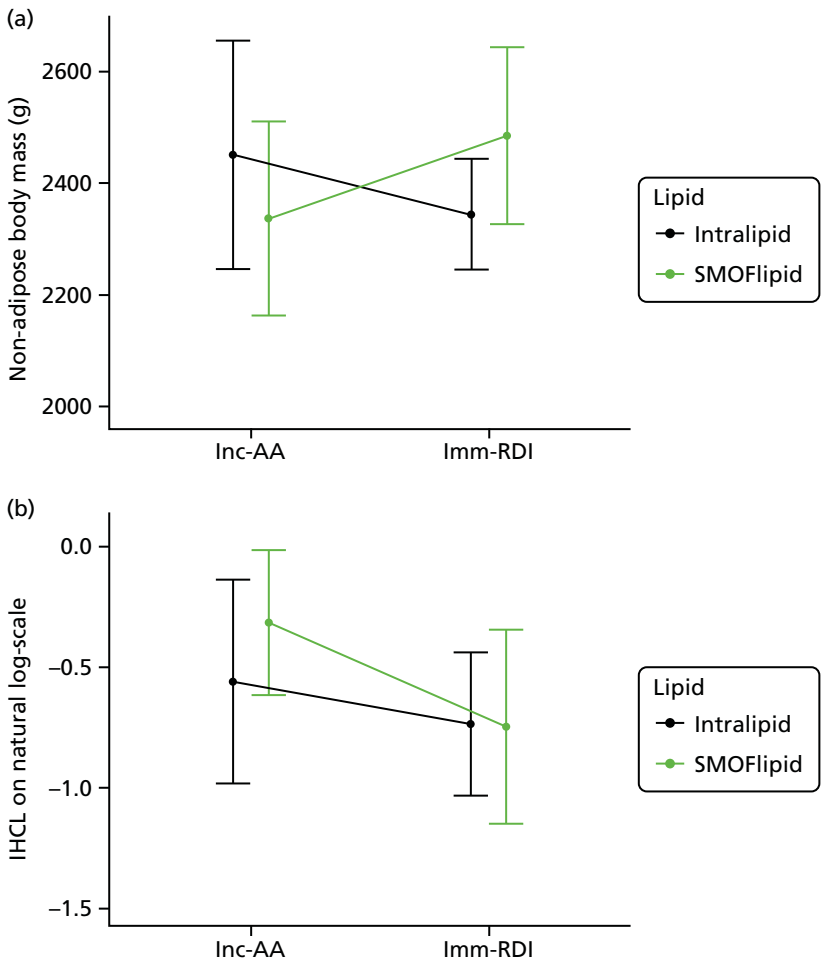


FIGURE 7 Means (95% CIs) of Inc-AA and Imm-RDI in two lipid subgroups for (a) non-adipose body mass; and (b) IHCL content on a log-scale.

TABLE 19 Baseline characteristics and trial outcomes (all infants completing primary outcome assessments)

	Inc-AA/Intralipid ($N = 34$)	Inc-AA/SMOFlipid ($N = 28$)	Imm-RDI/Intralipid ($N = 34$)	Imm-RDI/SMOFlipid ($N = 37$)	Adjusted mean difference (Imm-RDI minus Inc-AA)[a]	Adjusted mean difference (SMOFlipid minus Intralipid)[a]	Interaction (p-value)
G[illegible] (/[illegible]), [illegible] (5%)	28.0 (27.3 , 28.6)	28.0 (27.2 , 28.)	28.4 (27.7 , 2 .2)	27.7 (27.1 , 28.4)	–	–	–
[illegible] ( ), [illegible] (5%)	1064 (62 , 1166)	1103 (7 , 1226)	10 0 (3 , 1186)	105 (62 , 1155)	–	–	–
S[illegible], [illegible] (%), [illegible] (5%)	58.8 (40.7 , 75.4)	64.3 (44.1 , 81.4)	50.0 (33.4 , 67.6)	51.4 (34.4 , 67.5)	–	–	–
A[illegible] (/[illegible]) [illegible], [illegible] (5%)	12.5 (11.3 , 13.7)	12.4 (10. , 14.0)	12.1 (10.8 , 13.4)	13.3 (12.0 , 14.5)	–	–	–
[illegible]							
[illegible] ( ), [illegible] (5%)	2450 (2246 , 2655)	2337 (2164 , 2510)	2344 (2244 , 2444)	2485 (2327 , 2643)	1 (–108 , 111) $p = 0.$ 8	–41 (–150 , 68) $p = 0.46$	216 (0 , 432) $p = 0.05$
[illegible], [illegible] (5%)	0.6 (0.4 , 0.) $n = 34$	0.7 (0.5 , 1.0) $n = 28$	0.5 (0.4 , 0.6) $n = 34$	0.5 (0.3 , 0.7) $n = 36$	0.7 (0.5 , 1.1) $n = 132$ $p = 0.11$	1.1 (0.8 , 1.6) $n = 132$ $p = 0.58$	0.8 (0.4 , 1.7) $n = 132$ $p = 0.53$
S[illegible]							
[illegible] ([illegible]3), [illegible] (5%)	468 (41 , 518) $n = 13$	480 (425 , 534) $n = 10$	468 (414 , 523) $n = 11$	511 (440 , 583) $n = 15$	15 (–42 , 71) $n = 4$ $p = 0.61$	24 (–32 , 80) $n = 4$ $p = 0.40$	–26 (–142 , 0) $n = 4$ $p = 0.66$
[illegible] ([illegible]3), [illegible] (5%)	33 (304 , 373) $n = 13$	352 (31 , 385) $n = 10$	344 (2 6 , 3 3) $n = 11$	365 (321 , 410) $n = 15$	(–2 , 47) $n = 4$ $p = 0.64$	14 (–24 , 52) $n = 4$ $p = 0.47$	–2 (–107 , 4) $n = 4$ $p = 0.46$
[illegible] ([illegible]3), [illegible] (5%)[c]	30 (26 , 33) $n = 13$	31 (28 , 34) $n = 10$	30 (27 , 34) $n = 11$	35 (2 , 38) $n = 15$	1.44 (–1. , 4.87) $n = 4$ $p = 0.41$	2 (–2 , 5) $n = 4$ $p = 0.35$	–2 (– , 5) $n = 4$ $p = 0.64$

	Inc-AA/Intralipid ($N = 34$)	Inc-AA/SMOFlipid ($N = 28$)	Imm-RDI/Intralipid ($N = 34$)	Imm-RDI/SMOFlipid ($N = 37$)	Adjusted mean difference (Imm-RDI minus Inc-AA)[a]	Adjusted mean difference (SMOFlipid minus Intralipid)[a]	Interaction (p-value)
[illegible] (95%)[52]	0.18 (0.17, 0.1[illegible]) $n = 11$	0.1[illegible] (0.18, 0.20) $n = 6$	0.1[illegible] (0.18, 0.20) $n = 11$	0.18 (0.17, 0.20) $n = 11$	0.01 (0, 0.02) $n = 3$ $p = 0.20$	0.01 (–0.01, 0.02) $n = 3$ $p = 0.28$	–0.01 (–0.04, 0.02) $n = 3$ $p = 0.46$
[illegible] (), [illegible] (95%)	3060 (2780, 3340)	2[illegible]24 (2686, 3162)	2[illegible]32 (2780, 3085)	3151 (2[illegible]34, 3368)	17 (–136, 170) $p = 0.83$	–35 (–187, 117) $p = 0.65$	2[illegible]3 (–8, 5[illegible]3) $p = 0.06$
[illegible] (), [illegible] (95%)	47.7 (46.4, 4[illegible].0)	48.0 (46.6, 4[illegible].4)	48.2 (47.4, 4[illegible].0)	4[illegible].1 (47.8, 50.3)	0.5 (–0.3, 1.3) $p = 0.20$	0.2 (–0.6, 1.0) $p = 0.56$	0.5 (–1.1, 2.1) $p = 0.56$
[illegible] (), [illegible] (95%)	36.0 (34.[illegible], 37.1)	35.3 (34.6, 36.0)	34.8 (34.3, 35.3)	35.2 (34.5, 35.[illegible])	–0.8 (–1.5, –0.1) $p = 0.02$	–0.2 (–0.[illegible], 0.5) $p = 0.56$	1.1 (–0.2, 2.5) $p = 0.0$
[illegible] (), [illegible] (95%)	515 (437, 5[illegible]3)	4[illegible]5 (431, 55[illegible])	4[illegible]3 (431, 554)	564 (4[illegible], 62[illegible])	12 (–44, 68) $p = 0.67$	[illegible] (–46, 64) $p = 0.75$	73 (–38, 183) $p = 0.20$
[illegible] (), [illegible] (95%)	67.2 (55.5, 7[illegible].0)	65.0 (52.4, 77.5)	6[illegible].1 (57.2, 81.0)	71.2 (5[illegible].8, 82.5)	2.5 (–7.5, 12.6) $p = 0.62$	–3.4 (–13.4, 6.6) $p = 0.50$	0.1 (–1[illegible], 20.1) $p = 0.$[illegible]
[illegible] (), [illegible] (95%)	14.2 (11.0, 17.3)	13.0 (10.7, 15.2)	14.[illegible] (12.3, 17.5)	17.8 (14.8, 20.7)	2.0 (–0.5, 4.4) $p = 0.11$	0.4 (–2.0, 2.8) $p = 0.74$	3.5 (–1.3, 8.3) $p = 0.15$
[illegible] (), [illegible] (95%)	14.8 (12.2, 17.3)	14.1 (11.0, 17.2)	15.[illegible] (12.8, 18.[illegible])	16.5 (13.6, 1[illegible].3)	1.4 (–1.2, 4.1) $p = 0.28$	–0.8 (–3.4, 1.8) $p = 0.56$	0.5 (–4.8, 5.7) $p = 0.86$
[illegible] (), [illegible] (95%)	87.0 (72.4, 101.6)	84.5 (72.8, 6.2)	85.2 (73.8, 6.5)	102.6 (87.2, 118.1)	5.2 (–6.5, 17.0) $p = 0.38$	5.0 (–6.7, 16.6) $p = 0.40$	16.3 (–7.0, 3[illegible].6) $p = 0.17$
[illegible] (), [illegible] (95%)	610 (518, 702)	587 (50[illegible], 664)	58[illegible] (514, 663)	666 (58[illegible], 743)	16 (–51, 82) $p = 0.64$	6 (–60, 72) $p = 0.85$	77 (–55, 208) $p = 0.25$
[illegible] (%), [illegible] (95%)	1[illegible].4 (17.[illegible], 20.[illegible])	1[illegible].7 (18.4, 21.0)	1[illegible].6 (17.8, 21.4)	20.8 (1[illegible].4, 22.3)	0 (–0.01, 0.02) $p = 0.56$	0.01 (–0.01, 0.02) $p = 0.45$	

TABLE 19 Baseline characteristics and trial outcomes (all infants completing primary outcome assessments) (*continued*)

	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	Imm-RDI/Intralipid (*N* = 34)	Imm-RDI/SMOFlipid (*N* = 37)	Adjusted mean difference (Imm-RDI minus Inc-AA)[a]	Adjusted mean difference (SMOFlipid minus Intralipid)[a]	Interaction (*p*-value)
[illegible]							
[illegible] > 2.5[illegible] (%), [illegible] (5% [illegible])	2[illegible].4 (15.1, 47.5)	25.0 (10.7, 44.[illegible])	32.4 (17.4, 50.5)	27.0 (13.8, 44.1)	1.15 (0.48, 2.74) *p* = 0.76	0.68 (0.28, 1.62) *p* = 0.38	0.71 (0.12, 4.06) *p* = 0.70
[illegible] > 150 [illegible] (%), [illegible] (5% [illegible])	70.6 (52.5, 84.[illegible])	75.0 (55.1, 8[illegible].3)	67.6 (4[illegible].5, 82.6)	75.7 (58.8, 88.2)	0.[illegible]2 (0.41, 2.04) *p* = 0.83	1.32 (0.5, 2.[illegible]4) *p* = 0.50	1.2[illegible] (0.26, 6.47) *p* = 0.75
[illegible] > 40 [illegible] (%), [illegible] (5% [illegible])	11.8 (3.3, 27.5)	10.7 (2.3, 28.2)	5.[illegible] (0.7, 1[illegible].7)	8.1 (1.7, 21.[illegible])	0.47 (0.12, 1.85) *p* = 0.28	0.[illegible]3 (0.24, 3.54) *p* = 0.[illegible]2	1.65 (0.11, 25.34) *p* = 0.72
[illegible] > 60 [illegible] (%), [illegible] (5% [illegible])	8.8 (1.[illegible], 23.7)	7.1 (0.[illegible], 23.5)	8.8 (1.[illegible], 23.7)	5.4 (0.7, 18.2)	0.[illegible] (0.22, 4.41) *p* = 0.[illegible]	0.45 (0.0[illegible], 2.12) *p* = 0.31	0.5[illegible] (0.03, 12.6[illegible]) *p* = 0.74

[illegible]

TABLE 20 Adipose tissue compartments in litres for all infants completing MRI assessment

	Inc-AA/20% Intralipid ($n = 34$)	Inc-AA/20% SMOFlipid ($n = 28$)	Imm-RDI/20% Intralipid ($n = 34$)	Imm-RDI/20% SMOFlipid ($n = 37$)	Adjusted mean difference (Imm-RDI – Inc-AA),[a] *p*-value	Adjusted mean difference (20% SMOFlipid – 20% Intralipid),[a] *p*-value	Interaction, *p*-value
[illegible]	0.07 (0.06 , 0.0)	0.07 (0.06 , 0.0)	0.08 (0.06 , 0.0)	0.08 (0.07 , 0.0)	0 (–0.01 , 0.01) $p = 0.62$	0 (–0.01 , 0.01) $p = 0.50$	0 (–0.02 , 0.02) $p = 0.$
[illegible]	0.57 (0.4 , 0.66)	0.55 (0.48 , 0.62)	0.55 (0.48 , 0.62)	0.63 (0.55 , 0.7)	0.01 (–0.05 , 0.08) $p = 0.67$	0.01 (–0.05 , 0.07) $p = 0.75$	0.08 (–0.04 , 0.2) $p = 0.20$
[illegible]	0.03 (0.03 , 0.04)	0.03 (0.02 , 0.03)	0.03 (0.03 , 0.03)	0.03 (0.03 , 0.04)	0 (0 , 0) $p = 0.55$	0 (0 , 0) $p = 0.71$	0 (0 , 0.01) $p = 0.24$
[illegible]	0.02 (0.01 , 0.02)	0.02 (0.01 , 0.02)	0.02 (0.01 , 0.02)	0.02 (0.02 , 0.02)	0 (0 , 0) $p = 0.28$	0 (0 , 0) $p = 0.55$	0 (–0.01 , 0.01) $p = 0.86$
[illegible]	0.1 (0.08 , 0.11)	0.0 (0.08 , 0.11)	0.0 (0.08 , 0.11)	0.11 (0.1 , 0.13)	0.01 (–0.01 , 0.02) $p = 0.38$	0.01 (–0.01 , 0.02) $p = 0.40$	0.02 (–0.01 , 0.04) $p = 0.17$
[illegible]	0.02 (0.01 , 0.02)	0.01 (0.01 , 0.02)	0.02 (0.01 , 0.02)	0.02 (0.02 , 0.02)	0 (0 , 0) $p = 0.11$	0 (0 , 0) $p = 0.74$	0 (0 , 0.01) $p = 0.15$
[illegible]	0.68 (0.58 , 0.78)	0.65 (0.57 , 0.74)	0.65 (0.57 , 0.74)	0.74 (0.65 , 0.83)	0.02 (–0.06 , 0.0) $p = 0.64$	0.01 (–0.07 , 0.08) $p = 0.85$	0.0 (–0.06 , 0.23) $p = 0.25$

[illegible]

[illegible] (*Tables 21* [illegible] *22*).

TABLE 21 Summary of the covariates for secondary analysis

Covariates	Inc-AA/Intralipid (*N* = 34)	Inc-AA/SMOFlipid (*N* = 28)	RDI/Intralipid (*N* = 34)	RDI/SMOFlipid (*N* = 37)
[illegible] 1 [illegible] ( )	0.11(0.07–0.21)	0.11 (0.06–0.35)	0.12 (0.08–0.31)	0.16 (0.07–0.32)
[illegible] 2 [illegible] ( )	0.42 (0.21–0.5)	0.30 (0.20–0.46)	0.2 (0.20–0.44)	0.31 (0.21–0.42)
[illegible] ( )	0.80 (0.44–1.00) *n* = 33	0. 5 (0.28–1.00) *n* = 27	0.65 (0.10–0.) *n* = 33	0.70 (0.26–1.00) *n* = 37
[illegible] ( ), [illegible] ( )	31.5 (24.2–46.2)	34.4 (27.8–44.5)	42.8 (36.1–54.1)	48.5 (36.2–63.)
[illegible] ( ), [illegible] ( )	124.6 (8.5–178.7)	13 .6 (110.8–173.2)	12 . (10 .6–158.)	148.2 (111.8–182.6)
[illegible] ( ), [illegible] ( )	52.8 (35.5–68.6)	51.6 (42.7–68.6)	51.8 (38.1–5 .5)	53.1 (38.2–70.2)
[illegible] ( ), [illegible] ( )	213.0 (168.7–44 .4)	213.4 (154.0–302.2)	234.5 (155.3–335.4)	257.4 (187.3–365.2)
[illegible] ( ), [illegible] ( )	6 .0 (6 .6–1786.1)	867.7 (643.5–11 6.1)	1042. (644.8–13 0.7)	1080.4 (6 6.3–1531.5)
[illegible] ( ), [illegible] ( )	47 .8 (375.0– 42.3)	434.8 (32 .5–584.4)	515. (346. –613.8)	550.5 (374. –77 .6)

[illegible]

TABLE 22 Primary outcomes (pairwise comparisons)

	Adjusted mean difference (Imm-RDI/Inc-AA)[a]	Adjusted mean difference (SMOFlipid/Intralipid)[a]	Interaction (*p*–value)	Adjusted mean difference (Imm-RDI/Inc-AA)[b]	Adjusted mean difference (SMOFlipid/Intralipid)[b]	Interaction (*p*-value)
[illegible] ( ), [illegible] (5%)	1 (–108 111) $p = 0.$ 8	–41 (–150 68) $p = 0.46$	216 (0 432) $p = 0.05$	–44 (–226 13), $n = 130$ $p = 0.64$	–14 (–114 86), $n = 130$ $p = 0.78$	184 (–22 3 0) $p = 0.08$
[illegible] (5%)	0.7 (0.5 1.1), $n = 132$ $p = 0.11$	1.1 (0.8 1.6), $n = 132$ $p = 0.58$	0.8 (0.4 1.7), $n = 132$ $p = 0.53$	0.81 (0.37 1.80), $n = 12$ $p = 0.61$	0.8 (0.61 1.31) $n = 12$ $p = 0.57$	0.86 (0.3 1. 2), $n = 12$ $p = 0.71$

[illegible]

[illegible] (*Figure 8*).

[illegible] 2 [illegible] (*Figure 9*).

[illegible] (*Figures 10–12*).

[illegible] (*Figures 13–16*).

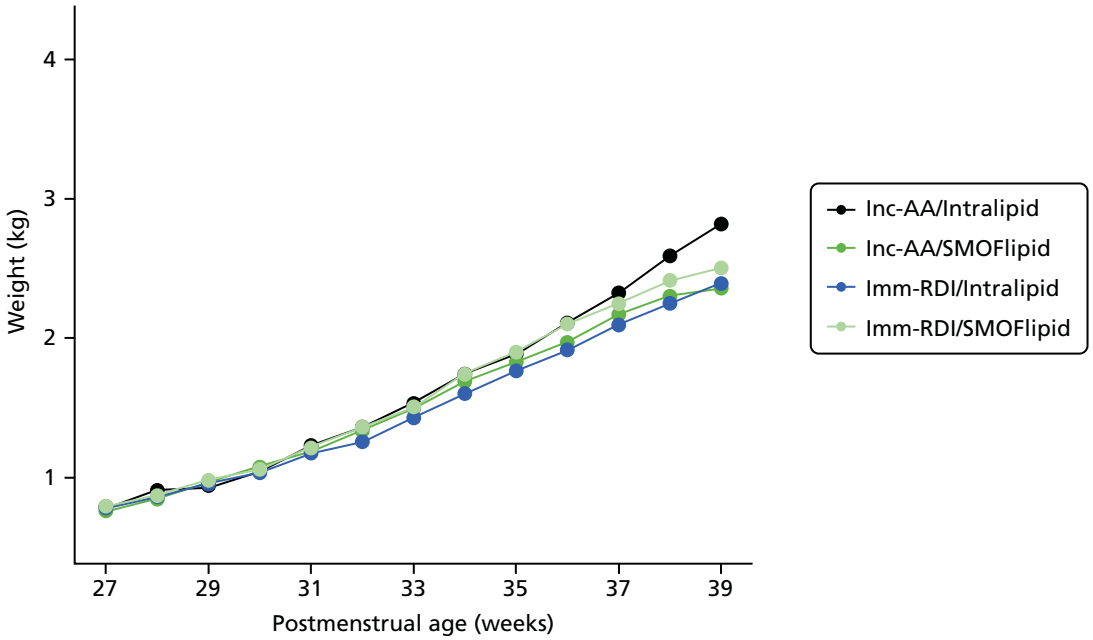


FIGURE 8 Time trend for babies' weights across four groups.

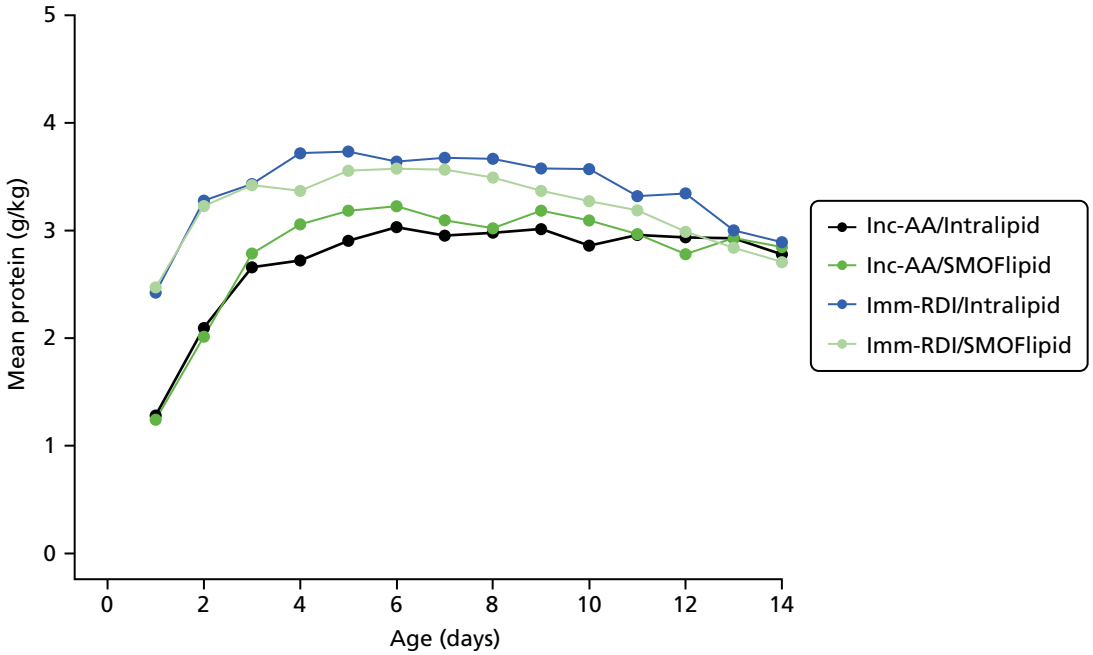


FIGURE 9 Daily protein intake from all sources in the first 2 weeks across four groups.

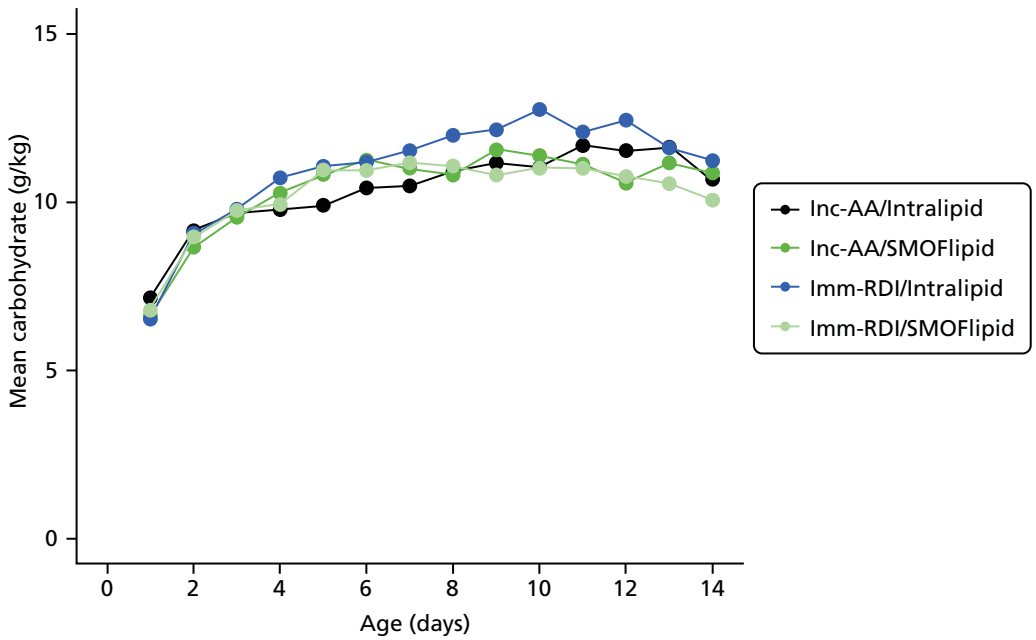


FIGURE 10 Daily carbohydrate intake from all sources in the first 2 weeks across all four groups.

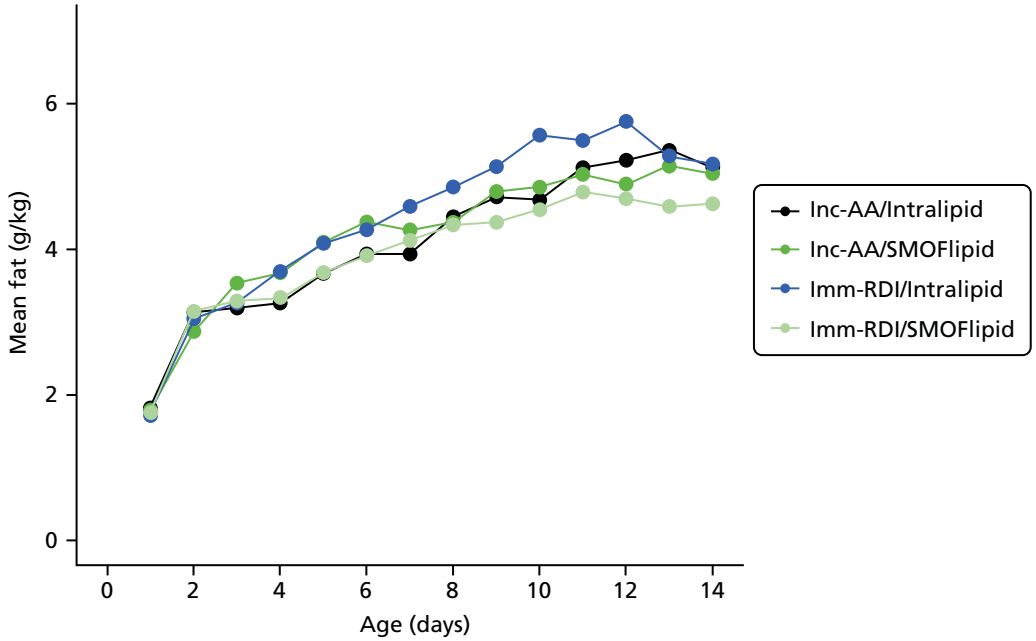


FIGURE 11 Daily fat intake from all sources in the first 2 weeks across all four groups.

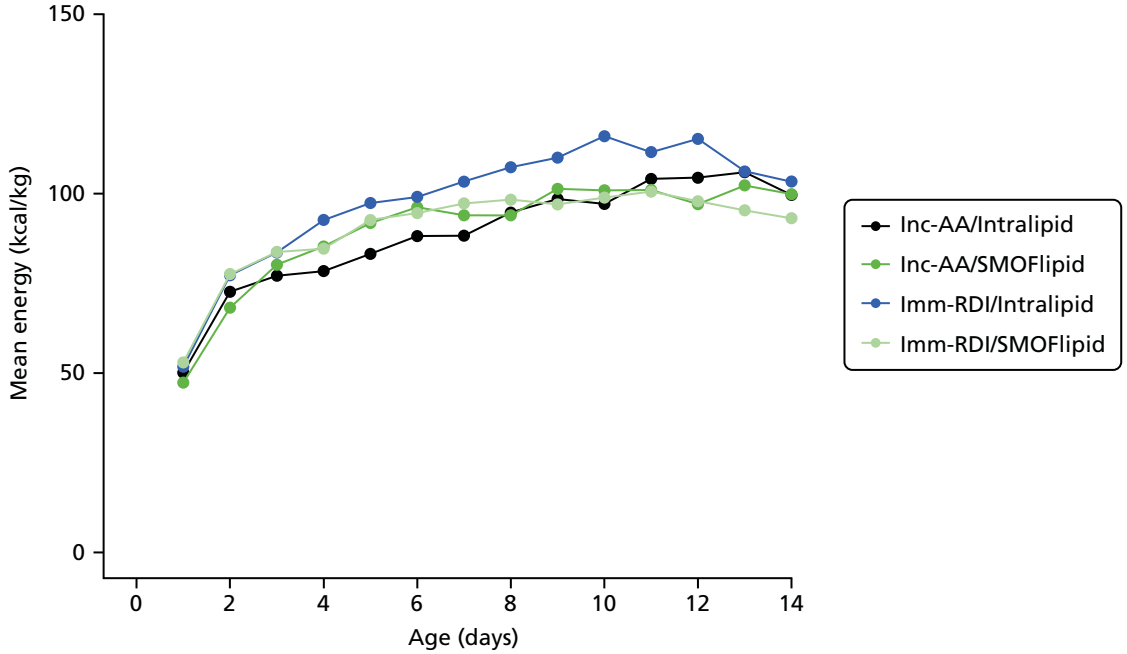


FIGURE 12 Daily energy intake from all sources in the first 2 postnatal weeks.

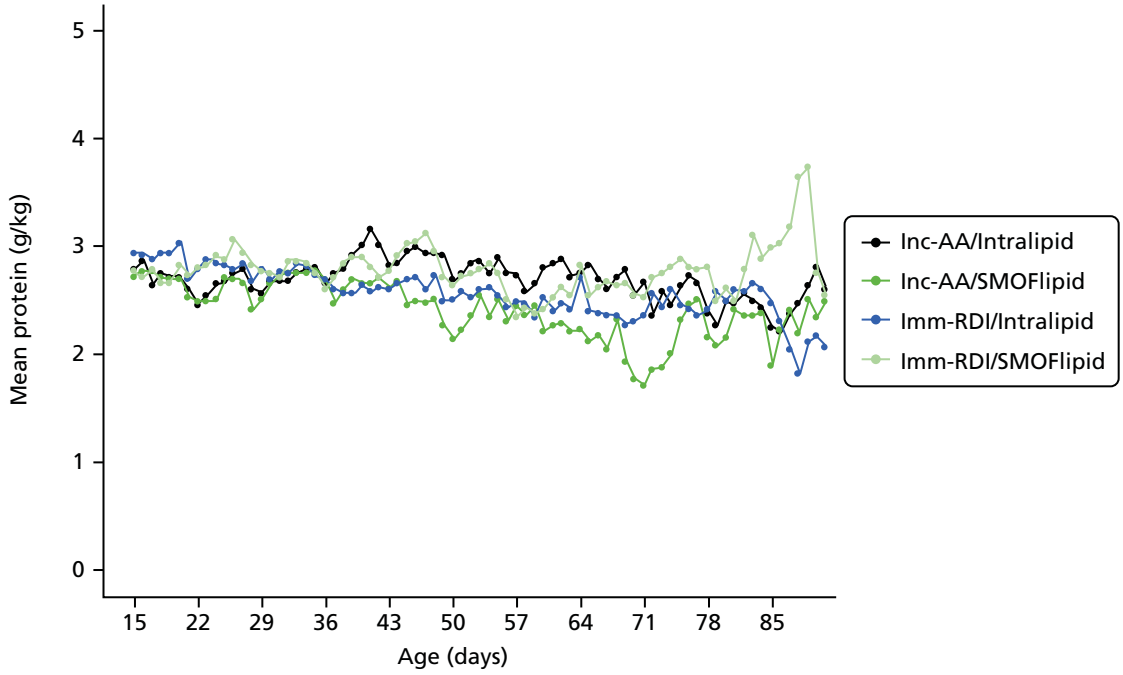
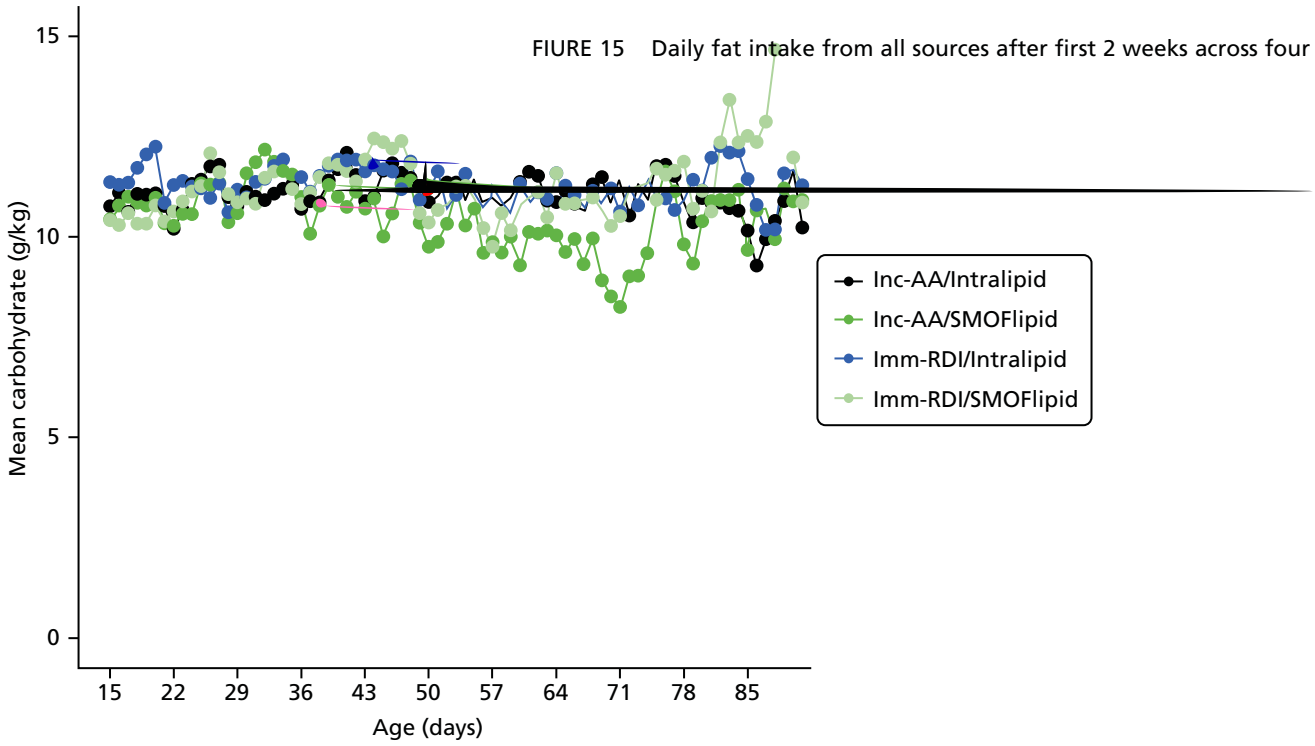


FIGURE 13 Daily protein intake from all sources after first 2 weeks across all four groups.



FIURE 15 Daily fat intake from all sources after first 2 weeks across four grou

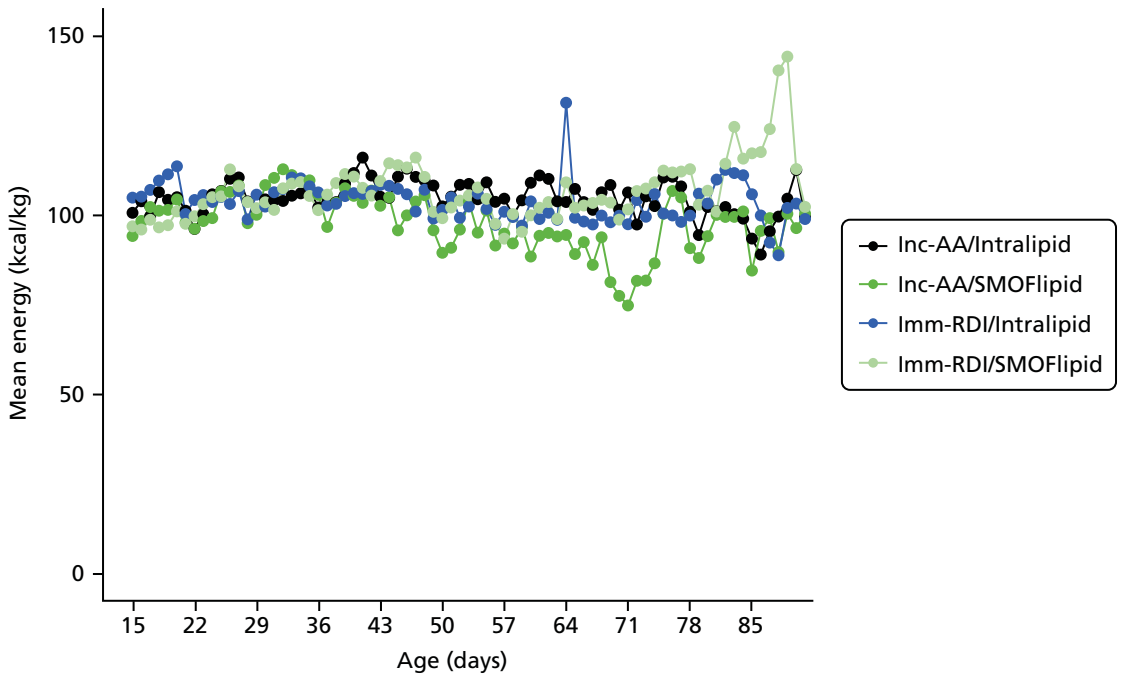


FIGURE 16 Daily energy intake from all sources after the first 2 postnatal weeks.

Chapter 5 Discussion

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[illegible] 2016. [illegible] *et al.* [illegible]

[illegible] <0.1% [illegible] <5% [illegible] *Tables 9* [illegible] *10*, [illegible] 24 [illegible]

[illegible] 2 [illegible] >27 [illegible] 31 [illegible] 33 [illegible]

[illegible][66] [illegible]

[illegible][40,41] [illegible]

[illegible] *et al.*,

[illegible] 2.1 (SD 0.4), [illegible] 2.6 (SD 0.21).[1] [illegible] 2.4 (95% CI 2.45 2.54), [illegible][11] [illegible]

[illegible][37] [illegible][35,75,76] [illegible][77] [illegible]

[illegible] 2-[illegible] 1-[illegible] 1-[illegible][68] [illegible] 37 [illegible]

Chapter 6 Conclusions and recommendations

[illegible]

Health-care recommendations

[illegible]

Research recommendations

1. [illegible]
2. [illegible]
3. [illegible]

[illegible] et al. [illegible] 2016. [illegible]

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Participating sites

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- [illegible]

Medway Maritime Hospital

- [illegible]

Northwick Park Hospital

- [illegible]

West Middlesex Hospital

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Data sharing statement

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References

1. [illegible] *Semin Perinatol* 2003 **27** 302–10. [illegible] /10.1016/S0146-0005(03)00044-2
2. [illegible] 20 [illegible]. *Pediatrics* 2003 **112** [illegible]30–8. [illegible] /10.1542/[illegible].112.1.[illegible]30
3. [illegible] *BMJ* 1[illegible] **318** 427–31. [illegible] /10.1136/[illegible].318.7181.427
4. [illegible] *BMJ* 2000 **320** [illegible] 67–71. [illegible] /10.1136/[illegible].320.7240.[illegible]67
5. [illegible] *Dev Med Child Neurol* 1[illegible]86 **28** 472–[illegible]. [illegible] /10.1111/[illegible].146[illegible]-874[illegible].1[illegible]86.[illegible]14285.[illegible]
6. [illegible] *J Pediatr* 2003 **143** 163–70. [illegible] /10.1067/S0022-3476(03)00243-[illegible]
7. [illegible] *Biol Neonate* 1[illegible]87 **52**(S[illegible]1) 17–24. [illegible] /10.115[illegible]/000242736
8. [illegible] *Pediatrics* 2006 **118** 1[illegible]43–[illegible]. [illegible] /10.1542/[illegible].2006-0733
[illegible] *BMJ* 2014 **349**[illegible] 4860. [illegible] /10.1136/[illegible] 4860
10. [illegible] *Pediatrics* 2001 **107** 270–3. [illegible] /10.1542/[illegible].107.2.270
11. [illegible] *et al.* [illegible] *BMJ Open* 2014 **4**[illegible]0053[illegible]0. [illegible] /10.1136/[illegible]-2014-0053[illegible]0
12. [illegible] *et al.* [illegible] *N Engl J Med* 2004 **351** 217[illegible]–86. [illegible] /10.1056[illegible]042275
13. [illegible] *Lancet* 2000 **355** 2135–6. [illegible] /10.1016/S0140-6736(00)02384-[illegible]
14. [illegible] *Pediatrics* 2008 **122** 313–21. [illegible] /10.1542/[illegible].2007-2012
15. [illegible] *et al.* [illegible] *N Engl J Med* 2007 **356** 2053–63. [illegible] /10.1056[illegible]067187

16. [illegible] A. [illegible] *Diabetologia* 2008 **51** 126 –75. // [illegible] /10.1007/ 00125-008-102 -5

17. [illegible] *Lancet* 2003 **361** 108 – 7. // [illegible] /10.1016/ S0140-6736(03)128 5-4

18. [illegible] G , *et al* [illegible] *Arch Dis Child Fetal Neonatal Ed* 2008 **93** 382–3. // [illegible] / 10.1136/ [illegible] .2007.127431

1 [illegible] G [illegible] *Pediatr Res* 2005 **57** 211–15. // [illegible] /10.1203/01. [illegible] .0000148284. 58 34.1

20. [illegible] *Early Hum Dev* 2006 **82** 77–84. // [illegible] /10.1016/ [illegible] .2006.01.002

21. [illegible] *Annu Rev Nutr* 2002 **22** 1–17. // [illegible] /10.1146/ [illegible] .22.111401.14504

22. [illegible] *Growth* 1 76 **40** 32 –41.

23. [illegible] G [illegible] G [illegible] *et al.* 1G [illegible] G [illegible] (G [illegible]) [illegible] (S [illegible]), [illegible] (S). *J Pediatr Gastroenterol Nutr* 2005 **41**(S . 2) 1–87. // [illegible] /10.10 7/ 01.l [illegible] .0000181841.070 0. 4

24. [illegible] *Nutrition of the Preterm Infant: Scientific Basis and Practical Guidelines.* [illegible] 2005.

25. [illegible] *Pediatric Nutrition Handbook*. 5 [illegible] G [illegible] 2004.

26. [illegible] G [illegible] *et al.* [illegible] *J Pediatr Gastroenterol Nutr* 2008 **47** 375–8. // [illegible] /10.10 7/ G .0 013 3181615

27. [illegible] *Early Hum Dev* 2007 **83** 631–4. // [illegible] /10.1016/ [illegible] .2007.07.013

28. [illegible] *Semin Perinatol* 2007 **31** 48–55. // [illegible] /10.1053/ [illegible] .2007.02.001

2 [illegible] *Improving Practice and Reducing Risk in the Provision of Parenteral Nutrition for Neonates & Children* [illegible] / [illegible] -%286%2 [illegible] (accessed 24 [illegible] 2015).

30. [illegible] *A Mixed Bag: An Enquiry into the Care of Hospital Patients Receiving Parenteral Nutrition* [illegible] /2010 [illegible] (accessed 24 [illegible] 2015).

31. [illegible] *J Nutr* 2015 **145** 277–83. // [illegible] /10.3 45/ .114.204 74

32. [illegible]. *Arch Dis Child Fetal Neonatal Ed* 2008 **93** 342–6. [illegible] /10.1136/[illegible].2007.124255

33. [illegible]. *Arch Dis Child Fetal Neonatal Ed* 2008 **93** 337–41. [illegible] /10.1136/[illegible].2007.124230

34. [illegible]. *Am J Clin Nutr* 2013 **97** 816–26. [illegible] /10.3[illegible]45/[illegible].112.042028

35. [illegible]. *J Pediatr* 2013 **163** 638–44.[illegible]5. [illegible] /10.1016/[illegible].2013.03.05

36. [illegible]. *Am J Clin Nutr* 2012 **96** 255–68. [illegible] /10.3[illegible]45/[illegible].112.040717

37. [illegible]. *Early Hum Dev* 2014 **90** 747–53. [illegible] /10.1016/[illegible].2014.0[illegible].002

38. [illegible], *et al.* [illegible]. *J Hosp Infect* 2008 **68** 66–72. [illegible] /10.1016/[illegible].2007.08.01

3[illegible]. [illegible]. *J Pediatr* 2008 **152** 5[illegible]–62. [illegible] /10.1016/[illegible].2007.06.002

40. [illegible]. *J Perinatol* 2004 **24** 482–6. [illegible] /10.1038/[illegible].7211114

41. [illegible]. *Pediatr Res* 2003 **53** 24–32. [illegible] /10.1203/00006450-200301000-00008

42. [illegible]. *Semin Perinatol* 2007 **31** 56–60. [illegible] /10.1053/[illegible].2007.02.005

43. [illegible]. *J Parenter Enteral Nutr* 2006 **30** 351–67. [illegible] /10.1177/0148607106030004351

44. [illegible], *et al.* [illegible]. *J Parenter Enteral Nutr* 2004 **28** 142–8. [illegible] /10.1177/0148607104028003142

45. [illegible]. *Pediatr Res* 200[illegible] **65** 584–7. [illegible] /10.1203/[illegible].0[illegible]013[illegible]3181[illegible]8[illegible]

46. [illegible]. *J Appl Physiol* 1[illegible]1 **70** 2164–72.

47. [illegible]. *Int J Obes Relat Metab Disord* 1[illegible]4 **18** 7[illegible]–83.

48. [illegible] *Comput Biol Med* 2001 **31** 26 –86. [illegible] /10.1016/S0010-4825(01)00006-3

4 . [illegible] *et al.* [illegible] *Meas Sci Technol* 200 **20** 104035. [illegible] /10.1088/0 57-0233/20/10/104035

50. [illegible] *J Magn Reson* 1 7 **129** 35–43. [illegible] /10.1006/[illegible]1 7.1244

51. [illegible] *et al.* [illegible] *IEEE Trans Med Imaging* 2014 **33** 1818–31. [illegible] /10.110 / .2014.2322280

52. [illegible] *et al.* [illegible] *J Clin Endocrinol Metab* 2000 **85** 2402–10. [illegible] /10.1210/[illegible] .85.7.6661

53. [illegible] *Arch Dis Child Fetal Neonatal Ed* 2003 **88** 62–6. [illegible] /10.1136/ .88.1. 62

54. [illegible] *Clinical Trials: A Practical Approach*. [illegible] 1 83.

55. [illegible] *JAMA* 2003 **289** 2545–53. [illegible] /10.1001/[illegible].28 .1 .2545

56. [illegible] *The Medicines for Human Use (Clinical Trials) Regulations 2004*. [illegible] /2004/1031/[illegible] (a[illegible] 24 [illegible] 2015).

57. [illegible] *Stat Med* 1 8 **17** 407–2 . [illegible] /10.1002/( )10 7-0258(1 80228)17 4<407 [illegible] 742>3.0. 2

58. [illegible] *Int J Obes* 2013 **37** 500–4. [illegible] /10.1038/ .2012.213

5 [illegible] *et al.* [illegible] *Am J Roentgenol* 2012 **199** 2–7. [illegible] /10.2214/A .11.7384

60. [illegible] *J Pediatr Gastroenterol Nutr* 2014 **58** 417–27. [illegible] /10.10 7/[illegible] .0000000000000280

61. [illegible] *J Parenter Enteral Nutr* 2012 **36**(S . 1) 81S–4S [illegible] /10.1177/0148607111424411

62. [illegible] *Early Hum Dev* 2014 **90** 27–31. [illegible] /10.1016/[illegible] .2013.11.002

63. [illegible] *J Pediatr Gastroenterol Nutr* 2010 **51** 514–21. [illegible] /10.10 7/ G .0 013 3181 210

64. [illegible] *Early Hum Dev* 2007 **83** 813–8. [illegible] /10.1016/ [illegible] .2007.0 .008

65. [illegible] *et al.* [illegible] *Pediatr Res* 2011 **70** 507–12. [illegible] /10.1203/ .0 013 31822 7860

66. [illegible] *et al.* [illegible] *Clin Nutr* 2013 **32** 207–12. [illegible] /10.1016/ [illegible] .2012.0 .004

67. [illegible] *et al.* [illegible] *Clin Nutr* 2014 **33** 82– 0. [illegible] /10.1016/ [illegible] .2014.01.002

68. [illegible] *Pediatrics* 2014 **133** 120–8. [illegible] /10.1542/ [illegible] .2013-2207

6 . [illegible] *J Nutr* 2014 **144** 1 20–7. [illegible] /10.3 45/ .114.1 7145

70. [illegible] *et al.* [illegible] 2 [illegible] *J Ped Gastroenterol Nutr* 2012 **54** 601–7.

71. [illegible] *et al.* [illegible] *Pediatrics* 1 **104** 280– . [illegible] /10.1542/ [illegible] .104.2.280

72. [illegible] *World Rev Nutr Diet* 2014 **110** 228–38. [illegible] /10.115 /000358471

73. [illegible] *et al.* [illegible] *J Pediatr* 2004 **144** 471– . [illegible] /10.1016/ [illegible] .2004.01.034

74. [illegible] *Pediatrics* 2012 **130** 640– . [illegible] /10.1542/ [illegible] .2011-337

75. [illegible] *Pediatrics* 2007 **120** 1286– 6. [illegible] /10.1542/ [illegible] .2007-0545

76. [illegible] *et al.* [illegible] 2.5 [illegible] *J Pediatr* 2013 **163** 1278–82.e1. [illegible] /10.1016/ [illegible] .2013.06.075

77. [illegible] *Pediatr Res* 2005 **58** 855–60. [illegible] /10.1203/01. .0000182586.46532.7

[illegible] 2016. [illegible] *et al.* [illegible] 16 [illegible]

Appendix 1 Distribution of primary and secondary outcomes after transformation

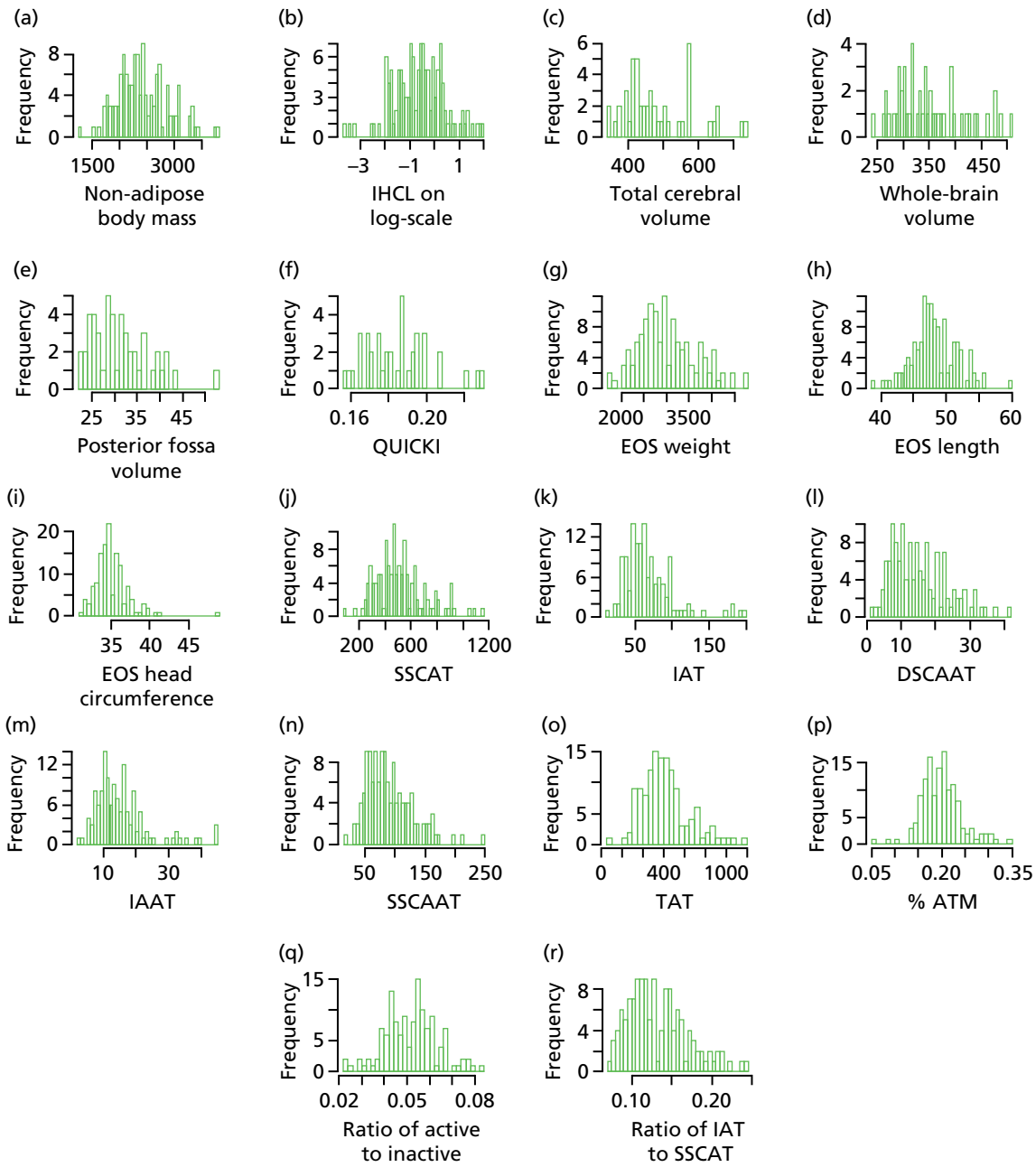

FIGURE 17 Distribution of primary and secondary outcomes after transformation. IHCL values are log-transformed. ATM, adipose tissue mass; DSCAAT, deep subcutaneous abdominal adipose tissue; EOS, end of study; IAAT, internal non-abdominal adipose tissue; IAT, internal adipose tissue; SSCAAT, superficial subcutaneous abdominal adipose tissue; SSCAT, superficial subcutaneous adipose tissue; TAT, total adipose tissue.

Appendix 2 Parent information sheet, magnetic resonance information sheet and consent form

INFORMATION SHEET FOR PARENTS

Study title: Amino acid regimen and intravenous lipid composition in preterm parenteral nutrition: a randomised controlled trial of Nutritional Evaluation and Optimisation in Neonates (NEON)

Invitation to participate
We would like to invite you to consider giving your consent to include your baby in a research study. Please take time to read this information carefully and discuss it with others if you wish. A member of our team will go through the information sheet with you. Please ask if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
Extremely preterm infants (born less than 31 weeks of gestation) spend several weeks and months in hospital. Feeding babies born so early is difficult. By the time they reach their due date their weight is typically about 1 kg (2 lbs) less than that of a full-term healthy baby.

Food is initially provided as a fluid called parenteral nutrition (PN) that is given into a vein. As extremely preterm babies may have other medical problems, traditionally, the amount of nutrition provided in PN has been gradually increased in a cautious, stepwise manner. This means that it can take several days to reach the full recommended nutritional intake to enable them to grow.

Though necessary, PN has complications, especially if used for several weeks. One complication is damage to the liver. The type of fat used in PN may affect this.

Recent studies have shown that giving preterm babies the recommended amount of nutrition straight away without the stepwise approach, and using a new type of fat (SMOF lipid) that contains soybean oil, olive and fish oil rather than the fat we currently use (Intralipid) which has soybean oil alone is safe. Although these approaches to feeding are used by doctors in day to day practice, we do not know for sure if one has benefit over the other in preterm babies. Before this can be introduced into everyday practice as recommendation we need to make sure this approach is beneficial.

The purpose of this study is to improve the growth and health of preterm babies. We will do this by:

1) comparing “immediate” introduction of Parenteral Nutrition with “stepwise” introduction
2) comparing the currently used fat in PN, with a newer type of fat that we hope is less harmful to the liver.

Why have I been invited?
You have been invited because your baby has been born prematurely (at less than 31 weeks of gestation) and needs Parenteral Nutrition.

Does my baby have to take part?
It is entirely up to you to decide whether or not you wish your baby to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form, a copy of which will be given to you. If you decide to take part

you are still free to withdraw your baby from the study at any time and without giving a reason. We would ask that you allow us to use any information collected up to that point. A decision not to take part will not affect the standard of care that your baby receives.

What will the study involve?
We will be enrolling 128 babies into this study. Babies will receive one of four different combinations of parenteral nutrition treatment.

Group 1: Stepwise introduction of PN and currently used fat
Group 2: Stepwise introduction of PN and newer lipid
Group 3: Immediate introduction of PN and currently used fat
Group 4: Immediate introduction of PN and newer lipid

The process of allocating which treatment a baby receives is done by 'randomisation'.

Randomisation means that a specially designed computer programme will determine the choice. There is a 50% chance that your baby will receive either type of treatment (like tossing a coin). Randomisation is done in order to ensure that every baby has the same chance of receiving either one or the other treatment. We will not know which treatment your baby receives until the end of the study. This is to prevent any bias in the results of the study.

Your baby will start milk feeds and the study PN within 24 hours as is normal practice. We recommend you provide your own expressed breast milk to your baby. When your baby is tolerating milk feeds well and no longer requires PN this will be stopped. We will collect the following information on your baby:

Routinely collected information
This is collected for any baby receiving care on a neonatal unit. This includes measurement of growth, recording the amount of nutrition (milk or PN) a baby receives and blood tests that show the effect of nutrition on the body.

Information collected for research
This is information that will be collected in addition to routine tests and information. The blood tests will be done at the same time as other routine blood tests and after the tests are done the samples will be destroyed. The samples will be labelled with a unique trial identification number.

The following additional tests will be done:

1. We will take 3 drops of blood in the first week, and additionally, once a week during your baby's stay in hospital, we will collect a few drops of urine (10 drops) and stool from the nappy to measure metabolite levels. The test uses a new technique called magnetic resonance (a method that uses a magnetic field) which allows a large number of metabolites (waste products of food) to be measured in very small quantities of blood or urine.

2. If your baby is born at Chelsea and Westminster hospital, we will take a few drops of blood (0.5 – 1 ml) to measure the type of fat present in the blood on the first and fifth day after birth.

3. When your baby reaches his /her due date we will take a few drops (1ml) of blood to measure sugar, insulin and metabolite levels.

4. In order to determine the results of the treatments on the development of the body, brain and liver, we will arrange a magnetic resonance (MR) scan to obtain pictures of your baby's body and brain. This will be done when you baby has reached his or her due date and has gone home. We will give you more information about this nearer the time of this scan.

Other than the MR scans the study samples may not be taken if your baby is transferred to another hospital. If this is the case we will take a sample of urine when your baby has the MR scan.
After your baby has had his or her scan, involvement in this study will end. Your baby will continue to receive routine care and follow up. If you agree, we may contact you about future research studies looking at how nutrition affects babies in later life.

Expenses and payments
The MR scan is done at the Hammersmith Hospital where we will ask you to come for a morning or an afternoon. We will arrange for a taxi or reimburse your travel and parking costs.

What are the alternatives for diagnosis or treatment?
If you choose not to enter your baby in to the study then your baby will receive standard care which will include PN. It is not routine practice to do MR scanning of the body, liver or brain.

What are the possible disadvantages and risks of taking part?
Parenteral nutrition (PN) is usually unavoidable for extremely preterm infants. The benefits of PN in neonatal intensive care are believed to outweigh the risks. The additional risk from using "immediate" PN from day one is minimal. Previous studies have not shown an increase in complications. SMOF lipid has been used in other studies and is often used in preterm infants receiving prolonged PN.

You will need to travel to the Hammersmith Hospital after discharge for the MR scans. They are not being carried out for clinical diagnosis but there is a possibility that they might show something unexpected. If this occurs, a senior doctor will explain this to you and notify your GP, and discuss whether any further action is necessary.

What are the possible benefits of taking part?
As we do not know if one treatment has benefit over the other there is no direct benefit to your baby. By following a standardised approach to milk feeding as in this study, there may be benefits to your baby. However, the information we obtain from this study may help us to improve nutrition of preterm babies in the future.

What if there is a problem?
All the treatments used in this study are currently used in day to day practice and it is not anticipated that there will be problems related directly to the study. As with all studies, Imperial College London holds insurance policies which apply to this study. If your baby experiences harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If your baby is harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator (Insert name and contact

details). The normal National Health Service complaint complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Office.

Will my baby's taking part in the study be kept confidential?
All information which is collected about your baby during the course of the research will be kept strictly confidential, and any information about your baby which leaves the hospital will have your baby's name and address removed so that he /she cannot be recognised. They may be looked at by authorised people to check that the study is being carried out correctly. All will have a duty of confidentiality to your baby as a research participant and we will do our best to meet this duty.

What if relevant new information becomes available?
Sometimes we get new information about the treatment being studied. If this happens, your research doctor will tell you and discuss your baby's options.

What will happen to the results of the research study?
We will publish the results in a scientific journal. No participant will be identified in any publication. We will send a letter summarising the results to the parents of the babies who took part. At this stage should you wish to know which group your baby was in we would be happy to provide you this information.

Who is organising and funding the research?
The research is being organised by Imperial College London. The study is being funded by the Efficacy and Mechanism Programme of the National Institute for Health Research.

Who has reviewed the study?
The study has been reviewed by independent doctors, specialists and parent representatives. All research in the NHS is looked at by independent group of people, called a National Research Ethics Committee, to protect the interests of participants. This study has been reviewed and given favourable opinion by the Hammersmith Hospital Research Ethics Committee

Further information and contact details
If you would like further information about the study please contact

Insert local PI details.

Nutritional Evaluation and Optimisation in Neonates Study: the NEON study.

Version 4: 28 Oct 2010

Nutritional Evaluation and Optimisation in Neonates Study: The NEON Study:

Information Sheet for parents on the Magnetic Resonance Scan:

We thank you for including your baby in the Nutritional Evaluation and Optimisation in Neonates (NEON) Study. This information sheet gives you additional information about the magnetic resonance (MR) scan which is the final part of this study.

As your baby is now preparing to go home we are in a position to arrange the MR scan which will look at how the body, brain and liver have developed. The results of this scan will be compared between the babies who have received different treatments in order to see whether or not one treatment has any benefits over the other. The scan will be done within roughly 2 weeks of your baby going home.

You will need to travel to the Hammersmith Hospital for this scan. We will arrange transport for you and your baby to and from the hospital or reimburse you for parking if you choose to drive yourself.

MR imaging is a technique widely used in infants and we have studied several hundred infants with MR. A MR scanner uses a magnet to take detailed pictures of the body and brain and measures the amount of fat in the liver.

The scan is carried out whilst your baby is in natural sleep without the use of sedatives. The scan normally takes no more than 40 minutes but sometimes additional time is required to settle a baby. You are welcome to be in the adjacent control room and watch your baby during the scan. During the scan your baby will be under the care of a doctor. As the MR scanner makes some noise we use baby ear muffs to protect your baby's ears. After the scan is complete we will measure your baby's growth and blood pressure.

We will be happy to show you the pictures taken of your baby. The scan is not being carried out for clinical diagnosis but there is a possibility that they might show something unexpected. If this occurs, a senior doctor will explain this to you and notify your GP, and discuss whether any further action is necessary. The brain scan however will be reported and the results will be sent to your baby's doctor who will be able to discuss this with you.

NEON Study Information Sheet for parents on MR scan Version 1 261109

CONSENT FORM FOR PARENTS

Version 2 dated 28th October 2010

Study title: Amino acid regimen and intravenous lipid composition in preterm parenteral nutrition: a randomised controlled trial of Nutritional Evaluation and Optimisation in Neonates (NEON)

Patient's name and hospital sticker

The parent should complete this sheet himself or herself.

Please initial boxes

1. I confirm that I have read and understand the parents information sheet dated 28th October 2010 (version 4) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that I am free to withdraw my baby from the study at any time without giving any reason, without my baby's medical care or legal rights being affected. ☐

3. I understand that relevant sections of any of my baby's medical notes and data collected during the study may be looked at by responsible individuals from the Clinical Trials and Evaluation Unit or staff from regulatory authorities where it is relevant to my baby taking part in research; I give permission for these individuals to have access to my baby's records. ☐

4 I understand that routine information about my baby's care may be collected for the purposes of the study if my baby is transferred to another hospital prior to discharge home. I agree to this information being collected. ☐

5. I agree to be contacted in the future to be informed about follow up studies that may take place. ☐

6. I agree to my baby being included in the above study. ☐

_____ _____ _____

NAME IN BLOCK CAPITALS Date Signature

Relationship to patient: _____

Investigator's signature _____Date _____

(INVESTIGATOR'S NAME IN BLOCK CAPITALS)_____

When completed, 1 for infant's parent; 1 for researcher file; 1 (original) to be kept in medical notes

NEON Consent Form v2.0 dated 28th October 2010

EME
HS&DR
HTA
PGfAR
PHR

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