National Institute for Health and Care Excellence

Draft for consultation

Neonatal parenteral nutrition

[H] Service design

NICE guideline tbc

Evidence reviews

September 2019

Draft for Consultation

These evidence reviews were developed by the National Guideline Alliance which is part of the Royal College of Obstetricians and Gynaecologists

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1 Service Design

2 Review question

3 Are nutrition care/support teams effective in providing parenteral nutrition in preterm and
4 term babies?

5 Introduction

6 Due to the complexity of providing parenteral nutrition (PN) to babies, multidisciplinary care
7 teams that have a special understanding of their nutritional requirements could offer added
8 expertise in ensuring adequate nutrition to avoid deficits and promote growth, whilst reducing
9 the risks associated with PN. The aim of this review is to determine whether multidisciplinary
10 teams (MDTS) are effective, safe and decrease the risk of PN complications.

11 Summary of the protocol

12 Please see Table 1 for a summary of the Population, Intervention, Comparison and Outcome
13 (PICO) characteristics of this review.

14 **Table 1: Summary of the protocol (PICO table)**

Population	• Nutrition care/support teams providing PN to babies born preterm, up to 28 days after their due birth date (preterm babies) • Nutrition care/support teams providing PN to babies born at term, up to 28 days after their birth (term babies)
Intervention	Multidisciplinary team with a specified composition or working arrangements, for example, in relation to inclusion of a pharmacist, dietitian, neonatologist, neonatal nurse or biochemist (or other laboratory specialist).
Comparison	• No nutrition care team • An individual (for example, physician alone) • A team with a different composition, or different arrangements for working together as compared to the intervention team.
Outcomes	**Critical** • Growth/anthropometric measures • Weight gain (g/kg/day) • Linear growth (cm) • Head circumference (cm) • Weight for length • Weight z score for age • Prescribing error • Achievement of target intake **Important** • Alteration to PN provision • Adherence to monitoring • Duration of PN • Adverse events (such as infection [including sepsis], mortality) • Duration of hospital stay • Parental satisfaction (measured by a validated scale)

15 *PN: Parenteral nutrition*

16 For full details see the review protocol in appendix A.

Clinical evidence

Included studies

No randomised controlled trials (RCTs) were identified; therefore, observational studies were included to inform decision making.

Four observational studies (Furtado 2015, Gover 2014, Jeong 2016, Sneve 2008) were identified for this review.

One study (Furtado 2015) compared the outcomes of infants with intestinal failure who were managed by an MDT (professionals from gastroenterology, neonatology, general surgery, nursing, nutrition, pharmacy, social work, and occupational therapy) to infants from a historic cohort who had not been treated by an MDT.

One study (Gover 2014) compared the outcomes of infants with gastroschisis who were managed by an MDT (professionals from three or more disciplines, e.g. neonatology, gastroenterology, dietetics)) to a control group of babies who had not been treated by an MDT

One study (Jeong 2016) compared improvements in clinical and nutritional outcomes in preterm infants managed by a multidisciplinary nutritional support team to a historical cohort who had not received treatment from an MDT.

One study (Sneve 2008) compared the outcomes of neonates ≤1500g who were managed by an MDT, which included a registered dietitian, to a historical cohort of babies managed before the introduction of the MDT.

It was not considered appropriate to pool the data from the Furtado 2015 and Gover 2014 studies with the Jeong 2016 and Sneve 2008 studies (which were considered similar inough to combine where outcomes align) due to the heterogeneous nature of the populations. The babies included in the Furtado 2015 and Gover 2014 studies had different complex needs and were therefore also not combined with each other; intestinal failure and gastroschisis respectively.

The included studies are summarised in Table 2.

See the literature search strategy in appendix B, study selection flow chart in appendix C, study evidence tables in appendix D, forest plots in appendix E, and GRADE tables in appendix F.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusions are provided in appendix K.

Summary of clinical studies included in the evidence review

Summaries of the studies that were included in this review are presented Table 2

Table 2: Summary of included studies

Study	Population	Intervention	Comparison	Outcomes	Comments
Furtado 2016 Observational study Canada	N= 55 Mean GA INFANT: 31.1 weeks (SD 4.8)	INFANT (n=28) Included professionals from: gastroenterology,	Pre-INFANT (n= 27) A historic cohort, prior to the MDT	• Duration of TPN • At least 1 septic episode	Babies all had short bowel syndrome (defined as the need for PN for more

Study	Population	Intervention	Comparison	Outcomes	Comments
	Pre-INFANT: 30.1 weeks (SD 4.9) Mean BW INFANT: 1736.8g (SD 975) Pre-INFANT: 1473g (SD 920)	neonatology, general surgery, nursing, nutrition, pharmacy, social work, and occupational therapy	were introduced. No details on who provided care.	• Septic episodes per patient • Mortality • Duration of hospital stay	than 42 days after bowel resection or a residual small bowel length of less than 25% expected for GA).
Gover, 2014 Observational study Canada	N = 396 Mean GA MDT: 36^{+2} weeks (SD 2) Control: 36^{+2} weeks (SD 2) Mean BW MDT: 2552g (SD 547) Control: 2551g (SD 560)	MDT (7 centres, n= 204) Included professionals from: 3 or more disciplines (e.g. neonatology, surgery, gastroenterology, dietetics)	Control (9 centres, n=192) Centres had no MDT	• Duration of PN • Length of stay • Mortality • At least one infection	Babies with gastroschisis
Jeong, 2016 Observational study South Korea	N = 229 Mean GA NST: 28^{+1} weeks (SD 2) Pre-NST: 27^{+5} weeks (SD 2) Mean BW NST: 952g (SD 266) Pre-NST: 895g (SD 260)	Nutritional Support Team (NST) (n= 122) Nutritional support through enhanced co-ordination of specialists (pharmacists, dietitians and nurses)	Pre-NST: (n= 107) Support co-ordinated solely by the attending physician, with intermittent consultation with pharmacists.	• Weight Z-score (at discharge) • Weight change Z-score (during hospital stay) • Achievement of 80kcal/kg at day 7 • PN Duration • Length of ICU stay • Mortality • Sepsis • NEC	Babies were less than 30 weeks' GA and had BW less than 1250g
Sneve 2008 Observational study USA	N = 105 Mean BW MDT: 1164g (95% CI 1067 – 1217)	MDT (n=63) Included a registered dietitian plus a neonatologist, clinical care co-ordinator, health	Pre-team (n=42) A historical cohort of babies prior to the MDT. No details as	• Weight • Head circumference • Length • NEC • Mortality • Length of stay	No gestation of babies was provided. All babies weighed less than, or equal to 1500g

Study	Population	Intervention	Comparison	Outcomes	Comments
	Pre-team: 1099g (95% CI 1003 – 1197)	unit co-ordinator, respiratory therapist, social worker, paediatric pharmacist, nursing director, nurses, case manager, nurse practitioner, medial consultants, paediatric development specialist and chaplain.	to who provided care		

BW: Birth weight; CI: confidence interval; GA: gestational age; ICU: intensive care unit; INFANT: Intestinal Failure and Advanced Nutrition Team; MDT: Multidisciplinary team; NEC: necrotising enterocolitis; NST: Nutrition support team; VLBW: Very low birth weight; PN: Parenteral nutrition; SD Standard deviation.

See appendix D for the full evidence tables.

Quality assessment of clinical outcomes included in the evidence review

GRADE was conducted to assess the quality of outcomes. Evidence was identified for critical and important outcomes. The clinical evidence profiles can be found in appendix F.

Economic evidence

Included studies

A systematic review of the economic literature was conducted but no economic studies were identified which were applicable to this review question. A single economic search was undertaken for all topics included in the scope of this guideline. Please see supplementary material D for details.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusions are provided in appendix K.

Summary of studies included in the economic evidence review

No economic evaluations were identified which were applicable to this review question.

Economic model

This topic was identified as a priority for economic modelling. However, the clinical evidence was of poor quality and insufficient to inform an economic model that would be useful for decision making in this area.

Clinical evidence statements

Weight z-score (discharge)

- Very low quality evidence from 1 observational study (n=229) showed no clinically important difference in weight at discharge of non-complex babies who received support

from a nutrition support team as compared to those who did not have a nutrition support team; Mean difference (MD): 0.16 (95% CI -0.01 to 0.42).

Weight at discharge

- Very low quality evidence from 1 observational study (n=105) showed a clinically important difference in weight at discharge of non-complex babies who received support from a nutrition support team as compared to those who did not have a nutrition support team; with an MDT resulting in greater weight: MD 503g (95% CI 327.23 to 678.77).

Weight change z-score (during hospital stay)

- Very low quality evidence from 1 observational study (n=229) showed no clinically important difference in the weight change during hospital stay of non-complex babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team; MD 0.22 (95% CI -0.01 to 0.45).

Weight gained

- Very low quality evidence from 1 observational study (n=105) showed a clinically important difference in the weight gained between non-complex babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team, an MDT resulted in greater weight gain. However, there was uncertainty around the effect: MD 358g (95% CI 212.27 to 743.73).

Head circumference growth

- Very low quality evidence from 1 observational study (n=105) showed a clinically important difference in the growth of non-complex babies head circumference between those who received support from a nutrition/care support team as compared to those who did not, the MDT resulted in better growth. However, there was uncertainty around the effect: MD 2cm (95% CI 0.91 to 3.09).

Head circumference at discharge

- Very low quality evidence from 1 observational study (n=105) showed a clinically important difference in the total head circumference between non-complex babies who received support from a nutrition/care support team as compared to those who did, an MDT resulted in greater head circumference at discharge: MD 2cm (95% CI 1.46 to 2.54).

Total length growth

- Very low quality evidence from 1 observational study (n=105) showed no clinically important difference in the length of non-complex babies between those who received support from a nutrition/care support team as compared to those who did not; MD 1cm (95% CI -1.08 to 3.08).

Length at discharge

- Very low quality evidence from 1 observational study (n=105) showed a clinically important difference in the length of non-complex babies at discharge between those who received support from a nutrition/care support team as compared to those who did not, an MDT resulted in greater length of babies at discharge. However, there was uncertainty around the effect; MD 2cm (95% CI 0.77 to 3.23).

Length of stay in NICU

- Very low quality evidence from 1 observational study (n=55) showed no clinically important difference in the mean number of days spent in NICU of babies with intestinal failure who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team. However, there was uncertainty around the effect; MD -10.00 (95% CI -49.73 to 29.73).
- Very low quality evidence from 1 observational study (n=396) showed no clinically important difference in the mean number of days spent in NICU of babies with gastroschisis who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team; MD 13.00 (95% CI 2.34 to 23.66).
- Very low quality evidence from 2 observational studies (n=334) showed no clinically important difference in the mean number of days spent in NICU of non-complex babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team. However, there was uncertainty around the effect; MD -1.57 days (95% CI -17.74 to 14.60).

Achievement of 80kcal/kg on day 7

- Very low quality evidence from 1 observational study (n=229) showed a clinically important difference in the number of non-complex babies who achieved 80kcal/kg on day 7 in those who received support from a nutrition support team as compared to those who did not have a nutrition support team, with more babies cared for by an MDT achieving this target. However, there was uncertainty around the effect: Relative risk (RR) 1.5 (95% CI 1.16 to 1.95).

PN duration

- Very low quality evidence from 1 observational study (n=55) showed a clinically important difference in the duration that babies with intestinal failure were on PN between those who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team, those babies cared for by an MDT were on PN for a longer duration. However, there was uncertainty around the effect: MD 63.70 (95%CI 20.34 to 107.06).
- Very low quality evidence from 1 observational study (n=396) showed no clinically important difference in the duration that babies with gastroschisis were on PN between babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team. However, there was uncertainty around the effect; MD 13.00 (95%CI 4.59 to 21.41).
- Very low quality evidence from 1 observational study (n=229) showed no clinically important difference in duration of PN between non-complex babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team; MD -4.4 (95%CI -9.31 to 0.51)

Mortality

- Very low quality evidence from 1 observational study (n=55) showed a clinically important difference in mortality of babies with intestinal failure who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team, fewer occurrences of mortality were observed in those babies cared for by an MDT. However, there was high uncertainty around the effect: RR 0.48 (95% CI 0.10 to 2.42).
- Very low quality evidence from 1 observational study (n=396) showed a clinically important difference in mortality of babies with gastroschisis who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team, fewer occurrences of mortality were observed in those babies cared

for by an MDT. However, there was high uncertainty around the effect: RR 0.47 (95% CI 0.16 to 1.35).

- Very low quality evidence from 2 observational studies (n=334) showed a clinically important difference in mortality of non-complex babies who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team, greater occurrences of mortality were observed with an MDT. However, there was high uncertainty around the effect: RR 1.94 (95%CI 0.47 to 8.09).

Necrotising enterocolitis (NEC)

- Very low quality evidence from 2 observational studies (n=334) showed no clinically important difference in the number of non-complex babies with NEC between those who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team. However, there was high uncertainty around the effect; RR 1.20 (95% CI 0.53 to 2.72).

Sepsis

- Very low quality evidence from 1 observational study (n=229) showed no clinically important difference in the number of non-complex babies with sepsis between those who received support from a nutrition/care support team as compared to those who did not have a nutrition support/care team. However, there was high uncertainty around the effect; RR 1.21 (95%CI 0.79 to 1.87).
- Very low quality evidence from 1 observational study (n=55) showed a clinically-important difference in the occurrence of sepsis in babies with intestinal failure, with greater occurrences in babies who received support from a nutrition/care support team as compared to those who did not have a nutrition/care support team. However, there was uncertainty around the effect; RR 1.29 (95%CI 0.95 to 1.75).

Mean number of septic episodes per baby

- Very low quality evidence from 1 observational study (n=55) showed no clinically important difference in the number of septic episodes in babies with intestinal failure who received support from a nutrition/care support team as compared to those who did have a nutrition/care support team. However, there was high uncertainty around the effect, MD 0.00 (95%CI -1.35 to 1.35).

Economic evidence statements

No studies were identified which were applicable to this review question.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee agreed that anthropometric outcomes, prescribing errors and achievement of target intake were the critical outcomes for this review. These outcomes are potentially influenced by the makeup of the team members who determine PN, for instance good oversight from a pharmacist with expertise should reduce prescribing errors. Important outcomes included alteration to PN provision, adherence to monitoring, duration of PN, adverse events, duration of hospital stay and parental satisfaction. These outcomes may all be influenced by an MDT, but would also be influenced by other factors within the NICU (for instance duration of PN may be due to the gestational age of the baby rather than due to the constituency of the MDT).

The quality of the evidence

The included outcomes were assessed using GRADE methodology, and all evidence presented was considered very low quality, indicating the data is unreliable. The included studies were all retrospective in design, and were downgraded due to serious risk of bias from confounding, deviations from the intended interventions, and unclear bias in measurement of outcomes. There was a high level of heterogeneity in the studies, and as such not all studies were combined (where populations varied considerably), analysis using a random effects model was undertaken to take this heterogeneity into account. In addition, data was considered imprecise; in sum the evidence should be interpreted with caution. None of the studies were from the UK, which also makes the services less generalisable to an NHS setting.

Benefits and harms

The committee agreed that overall the evidence was very low quality; however the evidence supported their knowledge and experience of when an MDT is likely more effective, for example babies with complex needs. Therefore, the committee considered the evidence and used it to support their clinical experience to make the recommendations by informal consensus.

Overall the evidence demonstrated that babies had a greater weight gain, greater weight at discharge and greater increase in head circumference when cared for by an MDT. However, some of the data (for example weight z-score at discharge and weight z-score during hospital stay and total length at discharge) showed no difference between groups in these outcomes, and this may be due to high levels of imprecision, making it difficult to draw firm conclusions.

In general, the included studies did not describe the composition of the non-MDT arm, so it was difficult to determine what effect the newly introduced MDT may be having on overall care. One study showed a significantly greater number of babies who were cared for by an MDT achieved a specific target of intake (80kcal/kg on day 7 [Jeong 2016]), and another study showed clinical benefits in weight and head circumference for babies who were cared for by an MDT [Sneve 2008]).

Two of the included studies (Furtado 2016 and Gover 2014) included babies with short gut syndrome and intestinal failure respectively; these are not the most frequent indications for PN in neonates, and only account for a small number of babies receiving PN; therefore, these studies were considered in isolation. The studies showed that fewer of these babies died when an MDT provided care. The presence of the MDT also resulted in babies receiving PN for longer. The committee discussed how it is difficult to determine whether it is more beneficial or not for babies to be on PN for longer or shorter time-periods; if a baby stays on PN for longer they may be receiving better nutrition, but they are at risk of line infections; however, the data did not clearly show this; therefore, the longer duration of PN did not appear to be detrimental. The committee agreed that with complex babies more regular MDT team meetings are likely required, and a wider range of specialist should be included (for example a gastroenterologist, who may not normally be included in the MDT).

The committee agreed that the included evidence, despite the limitations discussed above, demonstrated some benefits related to the clinical MDT. They noted that the evidence did not allow them to exactly determine which health care professionals should make up the MDT, and they agreed that details of the daily work of the MDT could not be defined because that would depend on the case load and the type of babies that are seen in the services that they would oversee or support. Even though the evidence did not directly address this, based on their knowledge of current practice and national reports related to shortcomings of current PN provision (see other considerations below) the committee also recognised that the team should not only provide clinical input but should also provide oversight of services. The committee agreed that policies and protocols are needed as well as the auditing of outcomes to ensure the safety of PN provision. The committee decided that a team of specialists

should be accessible to all services providing PN. Such teams should always contain a consultant neonatologist or paediatrician with a special interest in nutrition, pharmacist and dietitian to ensure there is expertise in the clinical, prescribing and nutritional core components of neonatal PN. The committee also recognised that access to other roles may be required, such as neonatal nursing, paediatric gastroenterology or expertise in clinical biochemistry to cover specific clinical or specialist areas of PN. The committee noted that if all core professionals listed in the recommendation and access to additional expertise where needed, to provide governance or clinical support, this would likely result in the provision of optimum PN for neonates. The committee are aware that not all units have all the listed professionals present on their units all the time. They discussed that most babies would not require daily bed-side assessments by all members listed within the MDT but that services need to be set up so that an MDT would have oversight of PN provision. This could mean access to them within a clinical network rather than availability to all of them locally.

The committee agreed that it is important that all members of the MDT have responsibility for PN governance and supporting delivery of PN. The committee discussed the importance of these professionals having their role within the MDT clearly recognised, and each member of the team would have clear and specific roles and responsibilities defined; however, they agreed this would be aspirational, but hope that these recommendations result in MDT members having dedicated time allocated for them to fulfil this role.

The committee, based on the evidence which demonstrated better outcomes associated with MDT involvement for babies with short gut syndrome or intestinal failure, agreed by informal consensus that babies with complex needs may require input from professionals other than those they listed for the oversight team. This 'enhanced' team could require the expertise of a gastroenterologist or a surgeon but the committee did not want to be prescriptive about these additional specialists. They agreed that the composition of an enhanced team would need to be tailored to each individual baby.

Cost effectiveness and resource use

No economic studies were identified which were applicable to this review question.

The committee explained that the question is not whether MDT should be provided or not. MDT input is necessary and the real question is as to the best composition and structure of the MDT. The committee noted that the clinical evidence was poor and insufficient to guide the committee as to the best composition of MDT and how the expertise of the team is used in service provision.

The committee discussed the role of the MDT i.e. to oversee and support the service to ensure that clinicians involved in the day to day care of the baby adhere to the guidelines and standards. They would also give a steer in the management of complicated cases. The committee also discussed key individuals required for this oversight MDT including consultant paediatrician or neonatologist, pharmacist, dietitian, neonatal nurse, and in some complicated cases a paediatric gastroenterologist. The committee noted that there may be a lack of certain experts in some centres and that there may be procurement issues. The committee explained that the network or regional centres should have such expertise available and individual centres within a network can draw on this expertise to support their local needs. The committee highlighted that these professionals already exist within the NHS and are funded for being part of the paediatric team and so the recommendations in this area would not incur additional resources to the NHS.

The committee explained that the MDT input would increase with the severity of the baby's condition. However, this is standard clinical practice and the recommendation pertaining to the enhanced MDT would not incur additional resources to the NHS.

Other factors the committee took into account

The committee took into account national reports that highlight inadequacies and safety concerns in the provision of neonatal PN (such as the National Confidential Enquiry into Patient Outcome and Death – PN from 2010 and the report from the Paediatric Chief Pharmacists Group in 2011 - improving practice and reducing risk in the provision of PN for neonates and children). They agreed that strong recommendations in favour of MDT input would help to address the concerns raised in these reports.

References

Furtado 2016

Furtado S., Ahmed N., Forget S., Sant' Anna A., Outcomes of patients with intestinal failure after the development and implementation of a multidisciplinary team. Canadian Journal of Gastroenterology and Hepatology, ID 9132134, 2016.

Gover 2014

Gover A., Albersheim S., Sherlock R., Claydon J., Butterworth S., Kuzeljevic B., Outcome of patients with gastroschisis managed with and without multidisciplinary teams in Canada. Paediatric Child Health 19 (3), 128-132, 2014.

Jeong 2016

Jeong E., Jung YH., Shin SH., Kim MJ., Bae HJ., Cho YS., Kim KS., Kim HS., Moon JS., Kim e-K., Kim H-S., Ko JS., The successful accomplishment of nutritional and clinical outcomes via the implementation of a multidisciplinary nutrition support team in the neonatal intensive care unit. BMC Paediatrics 16: 113, 2016.

Sneve 2008

Sneve J., Kattelmann K., Ren C., Stevens DC., Implementation of a Multidisciplinary team that includes a registered dietitian in a neonatal intensive care unit improved nutrition outcomes. Nutrition in Clinical Practice 23 (6), 630-634, 2008.

Appendices

Appendix A – Review protocols

Review protocol for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Table 3: Review protocol for review question: Are nutrition care/support teams effective in providing PN in preterm and term babies?

Field (based on PRISMA-P	Content
Review question	Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?
Type of review question	Intervention
Objective of the review	Due to the complexity of providing parenteral nutrition (PN) to babies, multidisciplinary care teams are recommended. Determining whether multidisciplinary teams, decrease the risk of PN related complications is required. The aim of this review is to determine if nutrition care teams are effective and safe in providing parenteral nutrition in preterm and term babies.
Eligibility criteria – population/disease/condition/issue/domain	• Nutrition care teams providing PN to babies born preterm, up to 28 days after their due birth date (preterm babies) • Nutrition care teams providing PN to babies born at term, up to 28 days after their birth (term babies).
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	Multidisciplinary team with a specified composition or working arrangements, for example in relation to inclusion of a pharmacist, dietitian, neonatologist, neonatal nurse or biochemist (or other lab specialist).
Eligibility criteria – comparator(s)/control or reference (gold) standard	• No nutrition care team • An individual (for example, physician alone) • A team with a different composition, or different arrangements for working together as compared to the intervention team

Field (based on PRISMA-P	Content

Outcomes and prioritisation	**Critical**
	
	• Growth/anthropometric measures
	  ○ Weight gain (g/kg/day)
	  ○ Linear growth (cm)
	  ○ Head circumference (cm)
	  ○ Weight for length
	  ○ Weight z score for age
	  ○ 2nd percentile of body mass index
	• Prescribing error
	• Achievement of target intake
	
	Important
	
	• Alteration to PN provision
	• Adherence to monitoring
	• Duration of PN
	• Adverse events (such as infection (including sepsis), mortality)
	• Duration of hospital stay
	• Parental satisfaction (measured by a validated scale)

Eligibility criteria – study design	Published full texts: • Systematic reviews of RCTs • RCTs • Comparative cohort studies (only if RCTs unavailable or limited data to inform decision making) Conference abstracts of RCTs will only be considered if no evidence is available from full published RCTs (if no evidence from RCTs or comparative cohort studies available and are recent i.e., in the last 2 years-authors will be contacted for further information).

Field (based on PRISMA-P	Content
Other inclusion exclusion criteria	No sample size restriction No date restriction
Proposed sensitivity/sub-group analysis, or meta-regression	<u>Stratified analysis</u> • Babies born preterm, up to 28 days after their due birth date (preterm babies) • Babies born at term, up to 28 days after their birth (term babies) Where evidence exists, consideration will be given to the specific needs of population subgroups: • Length of time on PN (first 2 weeks *vs.* later) • Preterm (extremely preterm <28 weeks' GA; very preterm: 28-31 weeks' GA; moderately preterm: 32-36 weeks' GA) • Birth weight: Low birth weight (< 2500g); very low birth weight (< 1500g) and extremely low birth weight (< 1000g) • Critically ill babies or those requiring surgery (for example, inotropic support, therapeutic hypothermia or fluid restriction) Important confounders (when comparative observational studies are included for interventional reviews): • Age of baby (first 2 weeks *vs.* later) • Preterm (Very early <28 weeks' GA; 28-31 weeks' GA; 32-36 weeks' GA) • Birth weight: Low birth weight (< 2500g); very low birth weight (< 1500g) and extremely low birth weight (< 1000g) • EN (in relation to length of hospital stay)
Selection process – duplicate screening/selection/analysis	Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. Quality control will be performed by the senior systematic reviewer. A random sample of the references will be sifted by a second reviewer. This sample size will be 10% of the total, or 100 studies if the search identifies fewer than 1000 studies. All disagreements will be resolved by discussion between the two reviewers. The senior systematic reviewer or guideline lead will act as arbiter where necessary.

Field (based on PRISMA-P	Content
Data management (software)	Pair-wise meta-analysis, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. Low income countries will be downgraded for indirectness. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists (ROBIS (systematic reviews and meta-analyses); Cochrane risk of bias tool (RCTs or comparative cohort studies); Cochrane risk of bias tool (Non-randomised studies).
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase. Limits (e.g. date, study design): All study designs. Apply standard animal/non-English language filters. No date limit. Supplementary search techniques: No supplementary search techniques were used. See appendix B for full strategies.
Identify if an update	This is not an update
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10037
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014.
Search strategy – for one database	For details please see appendix B
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables).
Data items – define all variables to be collected	For details please see appendix B.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual 2014.

Field (based on PRISMA-P	Content
	The risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details of methods please see supplementary material C.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014.
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014.
Rationale/context – Current management	For details please see the introduction to the evidence review.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Joe Fawke (Consultant Neonatologist and Honorary Senior Lecturer, University Hospitals Leicester NHS Trust) in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details of the methods please see supplementary material C.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.

Field (based on PRISMA-P	Content
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	The review is not registered with PROSPERO.

CCTR: Cochrane controlled trials register; CDSR: Cochrane database of systematic reviews; DARE: database of abstracts of reviews of effects; GA: Gestational age; GRADE: Grading of Recommendations Assessment, Development and Evaluation; NICE: National Institute of Clinical Excellence; NGA: National Guideline Alliance; NHS: National Health Service; PN: Parenteral nutrition; PROSPERO: International prospective register of systematic reviews; RCT: randomised controlled trial.

Appendix B – Literature search strategies

Literature search strategy for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Databases: Medline; Medline EPub Ahead of Print; and Medline In-Process & Other Non-Indexed Citations

#	Searches
1	INFANT, NEWBORN/
2	(neonat$ or newborn$ or new-born$ or baby or babies).ti,ab.
3	PREMATURE BIRTH/
4	((preterm$ or pre-term$ or prematur$ or pre-matur$) adj5 (birth? or born)).ab,ti.
5	exp INFANT, PREMATURE/
6	((preterm$ or pre-term$ or prematur$ or pre-matur$) adj5 infan$).ti,ab.
7	(pre#mie? or premie or premies).ti,ab.
8	exp INFANT, LOW BIRTH WEIGHT/
9	(low adj3 birth adj3 weigh$ adj5 infan$).ti,ab.
10	((LBW or VLBW) adj5 infan$).ti,ab.
11	INTENSIVE CARE, NEONATAL/
12	INTENSIVE CARE UNITS, NEONATAL/
13	NICU?.ti,ab.
14	or/1-13
15	PARENTERAL NUTRITION/
16	PARENTERAL NUTRITION, TOTAL/
17	PARENTERAL NUTRITION SOLUTIONS/
18	ADMINISTRATION, INTRAVENOUS/ and (nutrition$ or feed$ or fed$).ti,ab.
19	INFUSIONS, INTRAVENOUS/ and (nutrition$ or feed$ or fed$).ti,ab.
20	CATHETERIZATION, CENTRAL VENOUS/ and (nutrition$ or feed$ or fed$).ti,ab.
21	exp CATHETERIZATION, PERIPHERAL/ and (nutrition$ or feed$ or fed$).ti,ab.
22	((parenteral$ or intravenous$ or intra-venous$ or IV or venous$ or infusion?) adj3 (nutrition$ or feed$ or fed$)).ti,ab.
23	((peripheral$ or central$) adj3 line? adj3 (nutrition$ or feed$ or fed$)).ti,ab.
24	(catheter$ adj3 (nutrition$ or feed$ or fed$)).ti,ab.
25	(drip? adj3 (nutrition$ or feed$ or fed$)).ti,ab.
26	or/15-25
27	PATIENT CARE TEAM/
28	((patient? or medical or health) adj1 care team).ab,ti.
29	((multidisciplinary or multi-disciplinary or multiprofession$ or multi-profession$ or integrated or network$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
30	((interdisciplinary or inter-disciplinary or interprofession$ or inter-profession$ or integrated or network$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
31	((transdisciplinary or trans-disciplinary or transprofession$ or trans-profession$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
32	mdt?.ab,ti.
33	network meeting?.ti,ab.
34	or/27-33
35	INTERDISCIPLINARY COMMUNICATION/
36	((interdisciplinary or inter-disciplinary or interprofession$ or inter-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
37	((multidisciplinary or multi-disciplinary or multiprofession$ or multi-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
38	((transdisciplinary or trans-disciplinary or transprofession$ or trans-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
39	or/35-38
40	COOPERATIVE BEHAVIOR/
41	((co-operat$ or cooperat$) adj3 (care or service? or practice?)).ab,ti.
42	((co-ordinat$ or coordinat$ or network$) adj3 (care or service? or practice?)).ab,ti.
43	or/40-42
44	MODELS, ORGANIZATIONAL/
45	DELIVERY OF HEALTH CARE/
46	"DELIVERY OF HEALTH CARE, INTEGRATED"/
47	((care or healthcare or organiz$ or organis$) adj3 model?).ti,ab.
48	(service? adj3 (deliver$ or configure$)).ti,ab.
49	or/44-48
50	(special$ adj2 (team? or approach$ or program$ or care or manag$ or service? or package?)).ti,ab.
51	(compos$ adj3 team?).ti,ab.

#	Searches
52	(pharmacist? or dietician? or neonatologist? or neonatal nurse? or biochemist? or lab$ specialist?).ti.
53	(pharmacist? or dietician? or neonatologist? or neonatal nurse? or biochemist? or lab$ specialist?).ab. /freq=2
54	or/50-53
55	(nutrition$ adj3 (care or support$) adj3 team?).ti,ab.
56	14 and 26 and 34
57	14 and 26 and 39
58	14 and 26 and 43
59	14 and 26 and 49
60	14 and 26 and 54
61	14 and 55
62	or/56-61
63	limit 62 to english language
64	LETTER/
65	EDITORIAL/
66	NEWS/
67	exp HISTORICAL ARTICLE/
68	ANECDOTES AS TOPIC/
69	COMMENT/
70	CASE REPORT/
71	(letter or comment*).ti.
72	or/64-71
73	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
74	72 not 73
75	ANIMALS/ not HUMANS/
76	exp ANIMALS, LABORATORY/
77	exp ANIMAL EXPERIMENTATION/
78	exp MODELS, ANIMAL/
79	exp RODENTIA/
80	(rat or rats or mouse or mice).ti.
81	or/74-80
82	63 not 81

1 Databases: Embase; and Embase Classic

#	Searches
1	NEWBORN/
2	(neonat$ or newborn$ or new-born$ or baby or babies).ti,ab.
3	PREMATURITY/
4	((preterm$ or pre-term$ or prematur$ or pre-matur$) adj5 (birth? or born)).ab,ti.
5	((preterm$ or pre-term$ or prematur$ or pre-matur$) adj5 infan$).ti,ab.
6	(pre#mie? or premie or premies).ti,ab.
7	exp LOW BIRTH WEIGHT/
8	(low adj3 birth adj3 weigh$ adj5 infan$).ti,ab.
9	((LBW or VLBW) adj5 infan$).ti,ab.
10	NEWBORN INTENSIVE CARE/
11	NEONATAL INTENSIVE CARE UNIT/
12	NICU?.ti,ab.
13	or/1-12
14	PARENTERAL NUTRITION/
15	TOTAL PARENTERAL NUTRITION/
16	PERIPHERAL PARENTERAL NUTRITION/
17	PARENTERAL SOLUTIONS/
18	INTRAVENOUS FEEDING/
19	INTRAVENOUS DRUG ADMINISTRATION/ and (nutrition$ or feed$ or fed$).ti,ab.
20	exp INTRAVENOUS CATHETER/ and (nutrition$ or feed$ or fed$).ti,ab.
21	((parenteral$ or intravenous$ or intra-venous$ or IV or venous$ or infusion?) adj3 (nutrition$ or feed$ or fed$)).ti,ab.
22	((peripheral$ or central$) adj3 line? adj3 (nutrition$ or feed$ or fed$)).ti,ab.
23	(catheter$ adj3 (nutrition$ or feed$ or fed$)).ti,ab.
24	(drip? adj3 (nutrition$ or feed$ or fed$)).ti,ab.
25	or/14-24
26	*PATIENT CARE/
27	((patient? or medical or health) adj1 care team).ab,ti.
28	((multidisciplinary or multi-disciplinary or multiprofession$ or multi-profession$ or integrated or network$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
29	((interdisciplinary or inter-disciplinary or interprofession$ or inter-profession$ or integrated or network$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
30	((transdisciplinary or trans-disciplinary or transprofession$ or trans-profession$) adj3 (team? or staff$ or task force? or approach$ or program$ or system? or panel? or forum? or group? or care or manag$ or service?)).ab,ti.
31	mdt?.ab,ti.

#	Searches
32	network meeting?.ti,ab.
33	or/26-32
34	INTERDISCIPLINARY COMMUNICATION/
35	((interdisciplinary or inter-disciplinary or interprofession$ or inter-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
36	((multidisciplinary or multi-disciplinary or multiprofession$ or multi-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
37	((transdisciplinary or trans-disciplinary or transprofession$ or trans-profession$) adj3 (communic$ or collaborat$ or relation$)).ab,ti.
38	or/34-37
39	*COOPERATION/
40	((co-operat$ or cooperat$) adj3 (care or service? or practice?)).ab,ti.
41	((co-ordinat$ or coordinat$ or network$) adj3 (care or service? or practice?)).ab,ti.
42	or/39-41
43	*NONBIOLOGICAL MODEL/
44	*HEALTH CARE DELIVERY/
45	INTEGRATED HEALTH CARE SYSTEM/
46	((care or healthcare or organiz$ or organis$) adj3 model?).ti,ab.
47	(service? adj3 (deliver$ or configure$)).ti,ab.
48	or/43-47
49	(special$ adj2 (team? or approach$ or program$ or care or manag$ or service? or package?)).ti,ab.
50	(compos$ adj3 team?).ti,ab.
51	(pharmacist? or dietician? or neonatologist? or neonatal nurse? or biochemist? or lab$ specialist?).ti.
52	(pharmacist? or dietician? or neonatologist? or neonatal nurse? or biochemist? or lab$ specialist?).ab. /freq=2
53	or/49-52
54	(nutrition$ adj3 (care or support$) adj3 team?).ti,ab.
55	13 and 25 and 33
56	13 and 25 and 38
57	13 and 25 and 42
58	13 and 25 and 48
59	13 and 25 and 53
60	13 and 54
61	or/55-60
62	limit 61 to english language
63	letter.pt. or LETTER/
64	note.pt.
65	editorial.pt.
66	CASE REPORT/ or CASE STUDY/
67	(letter or comment*).ti.
68	or/63-67
69	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
70	68 not 69
71	ANIMAL/ not HUMAN/
72	NONHUMAN/
73	exp ANIMAL EXPERIMENT/
74	exp EXPERIMENTAL ANIMAL/
75	ANIMAL MODEL/
76	exp RODENT/
77	(rat or rats or mouse or mice).ti.
78	or/70-77
79	62 not 78

Databases: Cochrane Central Register of Controlled Trials; Cochrane Database of Systematic Reviews; Database of Abstracts of Reviews of Effects; and Health Technology Assessment

#	Searches
1	MeSH descriptor: [INFANT, NEWBORN] this term only
2	(neonat* or newborn* or new-born* or baby or babies):ti,ab
3	MeSH descriptor: [PREMATURE BIRTH] this term only
4	((preterm* or pre-term* or prematur* or pre-matur*) near/5 (birth? or born)):ti,ab
5	MeSH descriptor: [INFANT, PREMATURE] explode all trees
6	((preterm* or pre-term* or prematur* or pre-matur*) near/5 infan*):ti,ab
7	(pre#mie? or premie or premies):ti,ab
8	MeSH descriptor: [INFANT, LOW BIRTH WEIGHT] explode all trees
9	(low near/3 birth near/3 weigh* near/5 infan*):ti,ab
10	((LBW or VLBW) near/5 infan*):ti,ab
11	MeSH descriptor: [INTENSIVE CARE, NEONATAL] this term only
12	MeSH descriptor: [INTENSIVE CARE UNITS, NEONATAL] this term only
13	NICU?:ti,ab

#	Searches
14	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13
15	MeSH descriptor: [PARENTERAL NUTRITION] this term only
16	MeSH descriptor: [PARENTERAL NUTRITION, TOTAL] this term only
17	MeSH descriptor: [PARENTERAL NUTRITION SOLUTIONS] this term only
18	MeSH descriptor: [ADMINISTRATION, INTRAVENOUS] this term only
19	MeSH descriptor: [INFUSIONS, INTRAVENOUS] this term only
20	MeSH descriptor: [CATHETERIZATION, CENTRAL VENOUS] this term only
21	MeSH descriptor: [CATHETERIZATION, PERIPHERAL] explode all trees
22	#18 or #19 or #20 or #21
23	(nutrition* or feed* or fed*):ti,ab
24	#22 and #23
25	((parenteral* or intravenous* or intra-venous* or IV or venous* or infusion?) near/3 (nutrition* or feed* or fed*)):ti,ab
26	((peripheral* or central*) near/3 line? near/3 (nutrition* or feed* or fed*)):ti,ab
27	(catheter* near/3 (nutrition* or feed* or fed*)):ti,ab
28	(drip? near/3 (nutrition* or feed* or fed*)):ti,ab
29	#15 or #16 or #17 or #24 or #25 or #26 or #27 or #28
30	MeSH descriptor: [PATIENT CARE TEAM] this term only
31	((patient? or medical or health) near/1 care team):ti,ab
32	((multidisciplinary or multi-disciplinary or multiprofession* or multi-profession* or integrated or network*) near/3 (team? or staff* or task force? or approach* or program* or system? or panel? or forum? or group? or care or manag* or service?)):ti,ab
33	((interdisciplinary or inter-disciplinary or interprofession* or inter-profession* or integrated or network*) near/3 (team? or staff* or task force? or approach* or program* or system? or panel? or forum? or group? or care or manag* or service?)):ti,ab
34	((transdisciplinary or trans-disciplinary or transprofession* or trans-profession*) near/3 (team? or staff* or task force? or approach* or program* or system? or panel? or forum? or group? or care or manag* or service?)):ti,ab
35	mdt?:ti,ab
36	network meeting?:ti,ab
37	#30 or #31 or #32 or #33 or #34 or #35 or #36
38	MeSH descriptor: [INTERDISCIPLINARY COMMUNICATION] this term only
39	((interdisciplinary or inter-disciplinary or interprofession* or inter-profession*) near/3 (communic* or collaborat* or relation*)):ti,ab
40	((multidisciplinary or multi-disciplinary or multiprofession* or multi-profession*) near/3 (communic* or collaborat* or relation*)):ti,ab
41	((transdisciplinary or trans-disciplinary or transprofession* or trans-profession*) near/3 (communic* or collaborat* or relation*)):ti,ab
42	#38 or #39 or #40 or #41
43	MeSH descriptor: [COOPERATIVE BEHAVIOR] this term only
44	((co-operat* or cooperat*) near/3 (care or service? or practice?)):ti,ab
45	((co-ordinat* or coordinat* or network*) near/3 (care or service? or practice?)):ti,ab
46	#43 or #44 or #45
47	MeSH descriptor: [MODELS, ORGANIZATIONAL] this term only
48	MeSH descriptor: [DELIVERY OF HEALTH CARE] this term only
49	MeSH descriptor: [DELIVERY OF HEALTH CARE, INTEGRATED] this term only
50	((care or healthcare or organiz* or organis*) near/3 model?):ti,ab
51	(service? near/3 (deliver* or configure*)):ti,ab
52	#47 or #48 or #49 or #50 or #51
53	(special* near/2 (team? or approach* or program* or care or manag* or service? or package?)):ti,ab
54	(compos* near/3 team?):ti,ab
55	(pharmacist? or dietician? or neonatologist? or neonatal nurse? or biochemist? or lab* specialist?):ti,ab
56	#53 or #54 or #55
57	(nutrition* near/3 (care or support*) near/3 team?):ti,ab
58	#14 and #29 and #37
59	#14 and #29 and #42
60	#14 and #29 and #46
61	#14 and #29 and #52
62	#14 and #29 and #56
63	#14 and #57
64	#58 or #59 or #60 or #61 or #62 or #63

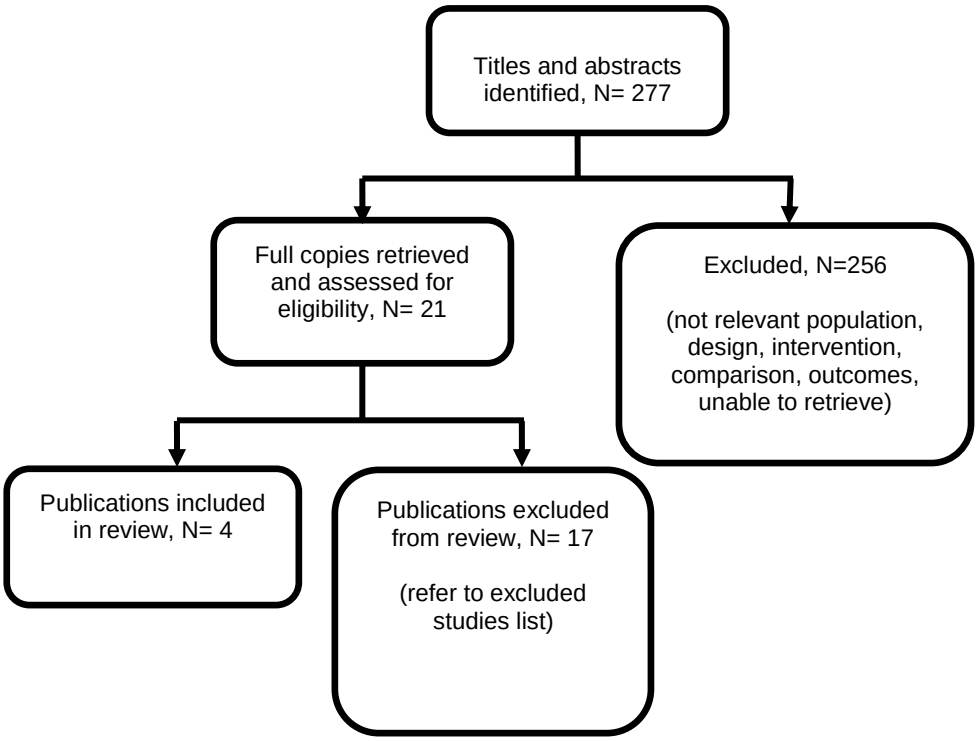
1

2

Appendix C – Clinical evidence study selection

Clinical study selection for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Figure 1: PRISMA Flow chart of clinical article selection for review question: Are nutrition care/support teams effective in providing PN in preterm and term babies?



1 Appendix D – Clinical evidence tables

2 Clinical evidence tables for review question: Are nutrition care/support teams effective in providing parenteral nutrition in 3 preterm and term babies?

4 Table 4: Clinical evidence tables for included studies

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Furtado, Sabrina, Ahmed, Najma, Forget, Sylviane, Sant'Anna, Ana, Outcomes of Patients with Intestinal Failure after the Development and Implementation of a Multidisciplinary Team, Canadian journal of gastroenterology & hepatology, 2016, 9132134, 2016 Ref Id 745052 Country/ies where the study was carried out Canada Study type Observational study Aim of the study To evaluate outcomes of patients with intestinal failure after implementation of a multidisciplinary team	Sample size Pre-INFANT cohort: N=27 INFANT (Intestinal Failure and Advanced Nutrition Team) cohort: N=28 Characteristics Gestational age (weeks) - mean ±SD Pre-INFANT: 30.1 (4.9) INFANT: 31.3 (4.8) Birth weight (g) - mean ±SD Pre-INFANT: 1473 (920) INFANT: 1736.8 (975)	Interventions Pre-INFANT: neonates born between December 1, 2006 and November 30, 2009 INFANT: neonates born between December 1, 2009 and December, 15 2012	Details INFANT team (professionals from gastroenterology, neonatology, general surgery, nursing, nutrition, pharmacy, social work, and occupational therapy) co-ordinate highly complex care of patients with intestinal failure. Protocols (e.g. ethanol lock therapy for preventing catheter related blood stream infections and fish oil based emulsions to reverse/stabilise total parenteral nutrition (TPN) cholestasis) put in place by INFANT. Infants also given enteral nutrition (EN).	Results Duration of TPN (days) - mean ±SD Pre-INFANT: 107.9 (68.9) INFANT: 171.6 (93.7); p=0.006 At least 1 septic episode - number (%) Pre-INFANT: 18 (66.7) INFANT: 24 (85.7); p=0.096 Septic episodes per patient - mean ±SD Pre-INFANT: 2.83 (2.66) INFANT: 2.83 (2.44); p=not significant Cholestasis - number (%) Pre-INFANT: 23 (85.2)	Limitations ROBINS-I Confounding bias: Serious risk of bias (infants with intestinal failure and different aetiology, with some infants having more than one aetiology, e.g. gastroschisis and NEC) Selection of participant's bias: Serious risk of bias (retrospective study; start and follow-up of the two cohorts differ) Classification of interventions bias: Serious risk of bias (pre-INFANT group not clearly defined and information not recorded at start of intervention as a retrospective study)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates December 2006 to November 2012 Source of funding None stated	Sex (male) - number (%) Pre-INFANT: 14 (60) INFANT: 11 (39) Aetiology NEC - number (%) Pre-INFANT: 20 (74) INFANT: 11 (39); p=0.009 Intestinal atresia - number (%) Pre-INFANT: 3 (11) INFANT: 5 (18) Gastroschisis - number (%) Pre-INFANT: 2 (7) INFANT: 4 (14) Volvulus - number (%) Pre-INFANT: 1 (4) INFANT: 4 (14) Inclusion criteria Patients diagnosed with short bowel		Statistical analyses Means and continuous data were compared using t-test and proportions were compared using Chi-square test.	INFANT: 23 (82.1); p=0.760 Liver failure - number (%) Pre-INFANT: 0 INFANT: 0; p=not significant Overall mortality - number (%) Pre-INFANT: 4 (14.8) INFANT: 2 (7.1); p=0.362 Duration of hospital stay (days) - mean ±SD Pre-INFANT: 160.5 (83.6) INFANT: 202.9 (106.6); p=0.107	Deviations from intended interventions bias: Moderate risk of bias (no deviations reported; important co-interventions not balanced (patients in INFANT cohort took longer to achieve full EN; gastrostomy feeding tubes more frequently used in INFANT cohort) Missing data bias: No Information Measurement of outcomes bias: No Information (unclear whether outcome assessors were blinded, but unlikely due to safety reasons) Selection of the reported results bias: Low risk of bias (all outcomes reported) Overall bias: Serious risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	syndrome (SBS)** 3 years before to 3 years after the development of the multidisciplinary team. Diagnosed with necrotising enterocolitis (NEC), volvulus, gastroschisis, Hirschsprung's disease (HD), intestinal atresia, small bowel perforation, dysmotility, gastroparesis, gastric necrosis, or meconium ileus. Exclusion criteria Not stated				*SBS defined as the need for PN for more than 42 days after bowel resection or a residual small bowel length of less than 25% expected for gestational age.
Full citation Gover, A., Albersheim, S., Sherlock, R., Claydon, J., Butterworth, S., Kuzeljevic, B., Outcome of patients with gastroschisis managed with and without multidisciplinary teams in Canada, Paediatrics and	Sample size Multidisciplinary team (7 centres): N=204 No multidisciplinary team (9 centres): N=192	Interventions MDT: 3 or more disciplines (neonatology, surgery, gastroenterology, dietetics) involved in regular rounds for	Details Infants were also given enteral feeds (EN). Statistical analyses Bivariate analyses were conducted to	Results Duration of PN (days) - mean ±SD Team: 47 (51) No team: 34 (33); p=0.003	Limitations ROBINS-I Confounding bias: Moderate risk of bias (higher proportion of infants considered to be at high risk in the no team intervention group,

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Child Health (Canada), 19, 128-132, 2014 Ref Id 815353 Country/ies where the study was carried out Canada Study type Observational study Aim of the study To assess the impact of a multidisciplinary team in the postoperative period on outcomes in patients with gastroschisis (GS) Study dates May 2005 to April 2009 Source of funding None stated	Characteristics Gestational age (weeks) - mean (range) Team: 36 (SD 2) (25-41) No team: 36 (SD 2) (26-41) Birth weight (g) - mean(range) Team: 2552 (SD 547) (540-3639) No team: 2551 (SD 560) (930-4275) Sex (male) - number Team: 56 No team: 54 Associated congenital anomalies - number Team: 26 No team: 30 High risk (N=331) - number Team: 17	patients with gastroschisis, beginning before initiation of feeds.	compare outcomes between centres with and without a team. Patient cohorts were stratified by risk (high or low) of inferior outcomes based on the Gastroschisis Prognostic Score. Outcomes of high and low risk patients were compared using Student's t-test, Pearson's X2 test and Fisher's exact test.	Length of stay (days) - mean ±SD Team: 57 (59) No team: 44 (49); p=0.018 Mortality - number Team: 5 No team: 10; p=0.14 At least one infection - % Team: 25 No team: 13; p=0.002 Conjugated bilirubin >10 µmmol/L at discharge - % Team: 19 No team: 22; p=0.41	but taken into account in statistical analyses) Selection of participant's bias: Moderate risk of bias (retrospective study) Classification of interventions bias: Serious risk of bias (no team group not clearly defined and information not recorded at start of intervention as a retrospective study) Deviations from intended interventions bias: Serious risk of bias (no deviations reported; important co-interventions not balanced (EN administered earlier in infants with a team; closure timings statistically significant between intervention groups) Missing data bias: Moderate risk of bias (outcomes stratified by risk (high versus low)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	No team: 11; p=0.03 Closure <6 hours - number Team: 31 No team: 68; p<0.01 Closure >24 hours - number Team: 51 No team: 15; p<0.01 Inclusion criteria Patient with gastroschisis born between May 2005 and April 2009 and included in the Canadian Paediatric Surgical Network (CAPSNet) database. Exclusion criteria Not stated				only available for N=331) Measurement of outcomes bias: No Information (unclear whether outcome assessors were blinded, but unlikely due to safety reasons) Selection of the reported results bias: Low risk of bias (all outcomes reported) Overall bias: Serious risk of bias Other information
Full citation Jeong, E., Jung, Y. H., Shin, S. H., Kim, M. J., Bae, H. J., Cho,	Sample size Nutritional support team (NST): N=122	Interventions NST: provision of high-quality nutritional	Details Parenteral support was managed initially	Results Weight Z-score at discharge - mean ±SD*	Limitations ROBINS-I

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Y. S., Kim, K. S., Kim, H. S., Moon, J. S., Kim, E. K., Kim, H. S., Ko, J. S., The successful accomplishment of nutritional and clinical outcomes via the implementation of a multidisciplinary nutrition support team in the neonatal intensive care unit, BMC Pediatrics, 16, 113, 2016 Ref Id 815357 Country/ies where the study was carried out South Korea Study type Observational study Aim of the study To evaluate the impact of a multidisciplinary nutritional support team Study dates January 1, 2009 to August 31, 2010; January 1, 2012 to August 31, 2013 Source of funding None	Pre-NST: N=107 Characteristics Gestational age (weeks) - mean ±SD NST: 28 (2) Pre-NST: 27 (2) Birth weight (g) - mean ±SD NST: 952 (266) Pre-NST: 895 (260) Small for gestational age - number (%) NST: 45 (36.9) Pre-NST: 38 (35.5) Sex (male) - number (%) NST: 50 (41.0) Pre-NST: 51 (47.7) Chorioamnionitis - number (%) NST: 58 (47.9) Pre-NST: 27 (25.2); p<0.001	support through enhanced co-ordination of specialists (pharmacists, dietitians and nurses) for screening for nutritional risk, identifying patients requiring nutritional support, providing adequate nutritional management, educating hospital staff, and auditing practices. Pre-NST: nutrition support co-ordinated solely by the attending physician, with intermittent consultation with pharmacists.	by the neonatal intensive care unit (NICU) physicians, but patients who required long-term parenteral nutrition (PN) could be referred to the NST pharmacists for customised total PN, providing individualised total PN regimens via re-consultations or feedback modulation on a daily basis. The same feeding protocol for enteral nutrition (EN) was applied throughout the study period, with EN referrals made to the NST dietitians. EN began when there were no contraindications for feeding, e.g. haemodynamic instability or abnormal abdomen. Statistical analyses Categorical outcomes were compared	NST: -1.49 (0.99) Pre-NST: -1.65 (1.01); p=0.235 Weight change Z-score during hospital stay - mean ±SD* NST: -0.91 (0.74) Pre-NST: -1.13 (0.99); p=0.055 PN Duration (days) - mean ±SD NST: 22.1 (14.3) Pre-NST: 26.5 (22.2) p=0.08 Length of ICU stay (days) - mean ±SD NST: 72.21 (32.89) Pre-NST: 81.72 (36.56); p=0.04 Mortality - number (%) NST: 7 (5.8) Pre-NST: 6 (5.6); p=0.954 Bronchopulmonary dysplasia - number (%) NST: 49 (41.5)	Confounding bias: Moderate risk of bias (authors went some way to address potential confounding in statistical analyses) Selection of participant's bias: Serious risk of bias (retrospective study; start and follow-up of the two cohorts differ) Classification of interventions bias: Serious risk of bias (retrospective study) Deviations from intended interventions bias: Moderate risk of bias (no deviations reported; important co-interventions not balanced (EN administered earlier in infants in NST group) Missing data bias: Low risk of bias Measurement of outcomes bias: No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Respiratory distress syndrome - number (%) NST: 72 (59.0) Pre-NST: 44 (41.1); p=0.007 Patent ductus arteriosus - number (%) NST: 74 (60.7) Pre-NST: 81 (75.7); p=0.015 Inclusion criteria Inborn neonates <30 weeks' gestational age at birth. Birth weight <1250 g. Exclusion criteria Infants diagnosed with a major congenital anomaly or inborn error of metabolism or who expired within 1 week of life.		between groups using chi-squared and Fisher's exact tests. Continuous data were compared using independent t-tests. Z-scores were assess using paired t-tests. Multivariate linear regression analysis was conducted to investigate potential confounding factors associated with length of intensive care unit stay.	Pre-NST: 39 (37.5); p=0.541 Intraventricular haemorrhage (≥stage 2) - number (%) NST: 19 (15.6) Pre-NST: 18 (16.8); p=0.469 Periventricular leukomalacia - number (%) NST: 11 (9.0) Pre-NST: 11 (10.3); p=0.459 Necrotising enterocolitis - number (%) NST: 11 (9.0) Pre-NST: 7 (10.7); p=0.488 Retinopathy of prematurity (operation) - number (%) NST: 25 (21.4) Pre-NST: 23 (21.5); p=0.981 Cholestasis - number (%) NST: 12 (9.8)	Information (unclear whether outcome assessors were blinded, but unlikely due to safety reasons) Selection of the reported results bias: Low risk of bias (all outcomes reported) Overall bias: Serious risk of bias Other information *EN differed significantly between intervention groups, with NST infants receiving EN and reaching full EN earlier compared to pre-NST infants, which may have affected weight Z-scores.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Pre-NST: 13 (12.1); p=0.575 Sepsis - number (%) NST: 36 (29.5) Pre-NST: 26 (24.3); p=0.376 Rickets - number (%) NST: 41 (36.9) Pre-NST: 33 (32.7); p=0.515	
Full citation Sneve, Jennifer, Kattelmann, Kendra, Ren, Cuirong, Stevens, Dennis C., Implementation of a multidisciplinary team that includes a registered dietitian in a neonatal intensive care unit improved nutrition outcomes, Nutrition in clinical practice : official publication of the American Society for Parenteral and Enteral Nutrition, 23, 630-4, 2008 Ref Id 997343 Country/ies where the study was carried out USA Study type Observational study	Sample size N = 105 MDT: n=63 Pre-team: n=42 Characteristics Weight at birth MDT: 1164g (95% CI 1067 to 1217) Pre-team: 1099g (95% CI 1003 to 1197) Length at birth MDT: 37cm (95% CI 36-38) 37cm (95% CI 36-38) Pre-team:	Interventions MDT consisted of: A registered dietitian, neonatologist, clinical care coordinator, health unit coordinator, respiratory therapist, social worker, paediatric pharmacist, nursing director, nurses, case manager, nurse practitioner, medical consultants, paediatric development specialist, chaplain	Details Two time periods included, pre introduction of an MDT and post introduction	Results Length of stay MDT: 72 days (95% CI 52 - 73) Pre-team: 65 days (95% CI 47-67) Weight at discharge MDT: 2947g (95% CI 2237 - 2559) Pre-team: 2444g (95% CI 2237 - 2559) Weight gained MDT: 1805g (95% CI 1337 - 1951) Pre-team: 1327g (95% CI 1023 - 1470)	Limitations No data given to determine differences between groups at baseline. Other information ROBINS-I Confounding bias: Serious risk of bias (weight different between groups at baseline - unclear if this was taken into account) Selection of participant's bias: Low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To determine if nutrition outcomes of NICU patients were improved after the introduction of a multidisciplinary nutrition support team that included a registered die titian Study dates January 2001 to December 2001 January 2004 to December 2004 Source of funding Health Resources and Services Administration (grant number T73MC00037)	Inclusion criteria Birth weight ≤1500g Exclusion criteria Babies with birth weight >1500g	No details provided regarding who provided care to neonates in the pre-team time period		Length at discharge MDT: 47cm (95% CI 45-48) Pre-team: 45cm (95% CI 44-46) Total length growth MDT: 9cm (95% CI 8-11) Pre-team: 8cm (95% CI 6-10) Head circumference at discharge MDT: 35cm (95% CI 34-35) Pre-team: 33cm (95% CI 32-33) Head circumference growth MDT: 8cm (95% CI 5-8) Pre-team: 6cm (95% CI 5-7) Number with NEC MDT: n=2 Pre-team: n= 2 Number of deaths MDT: n=13 Pre-team: n= 2	Classification of interventions bias: Serious risk of bias (no details about who managed the care of babies prior to the MDT (pre-team group) Deviations from intended interventions bias: Serious risk of bias (no deviations reported; differences in PN constituents between the two groups) Missing data bias: No information Measurement of outcomes bias: No Information (unclear whether outcome assessors were blinded, but unlikely due to safety reasons) Selection of the reported results bias: Serious risk of bias (do not provide details on differences at baseline for all confounders)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Days to reach EN feeding MDT: 8 days (95% CI 5-8) Pre-team: 7 days (95% CI 5-7)	Overall bias: Serious risk of bias

CI: confidence interval; EN: enteral nutrition; GS: gastroschisis; HD: Hirschsprung's disease; ICU: intensive care unit; INFANT: Intestinal Failure and Advanced Nutrition Team; MDT: multidisciplinary team; N: number; NEC: necrotising enterocolitis; NST: nutritional support team; PN: parenteral nutrition; ROBINS-I: risk of bias in non-randomised studies of interventions; SD: standard deviation; SBS: short bowel syndrome; TPN: total parenteral nutrition; USA: United States of America.

Appendix E – Forest plots

Forest plots for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Figure 2: MDT versus no MDT; length of stay in NICU

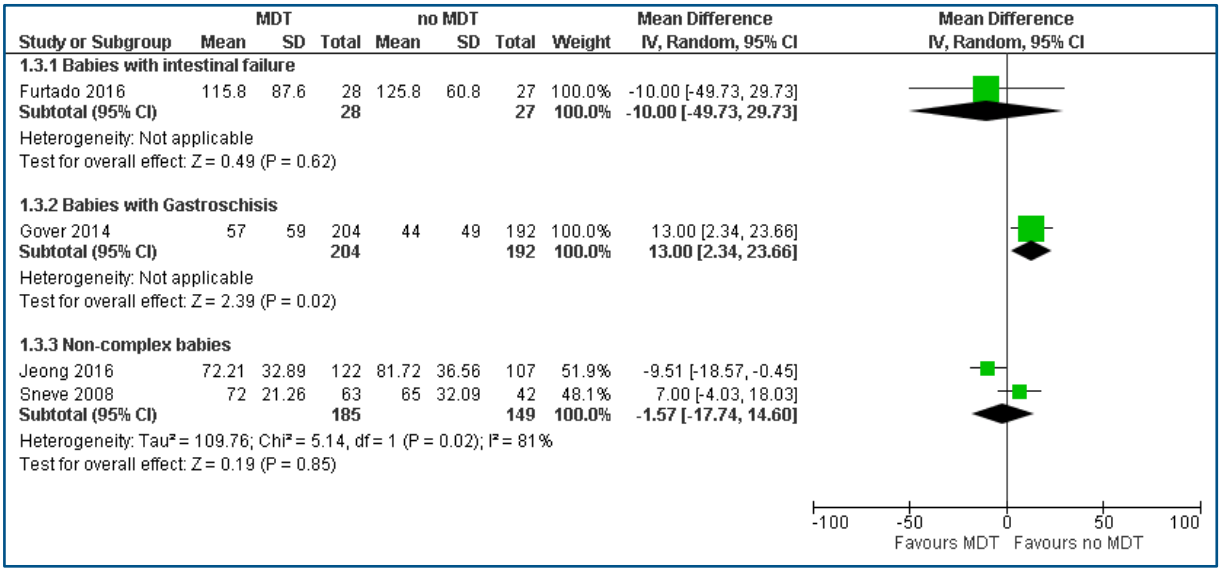


Figure 3: MDT versus no MDT; mortality of babies

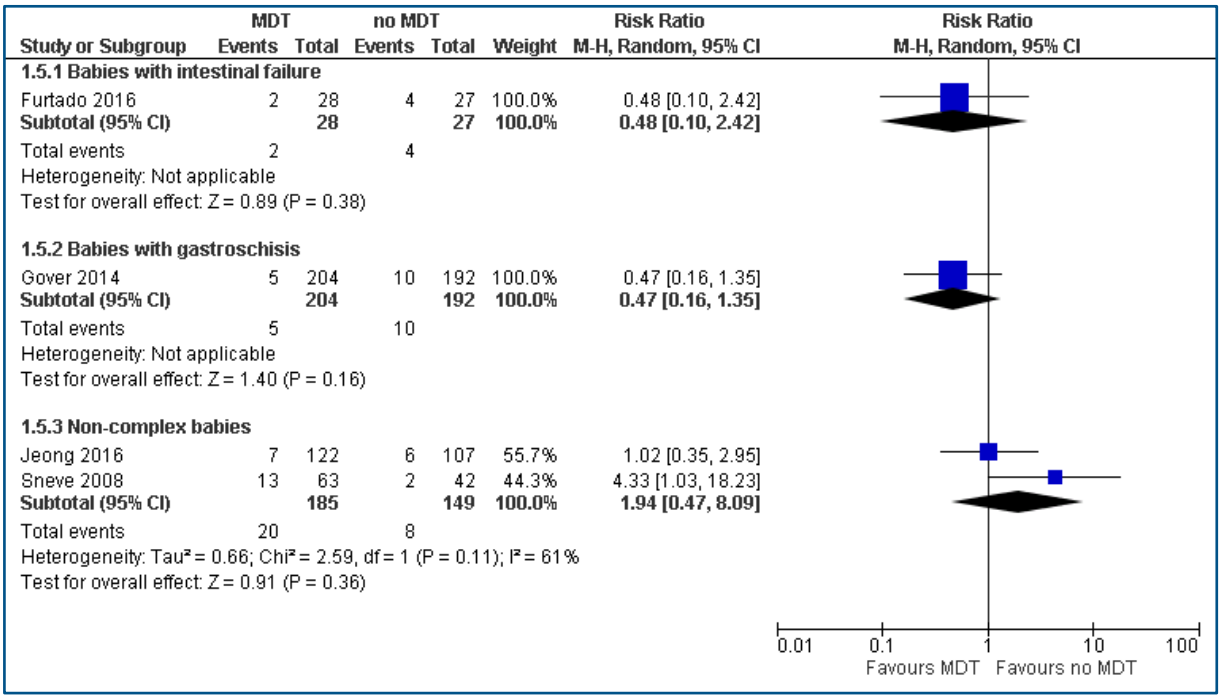
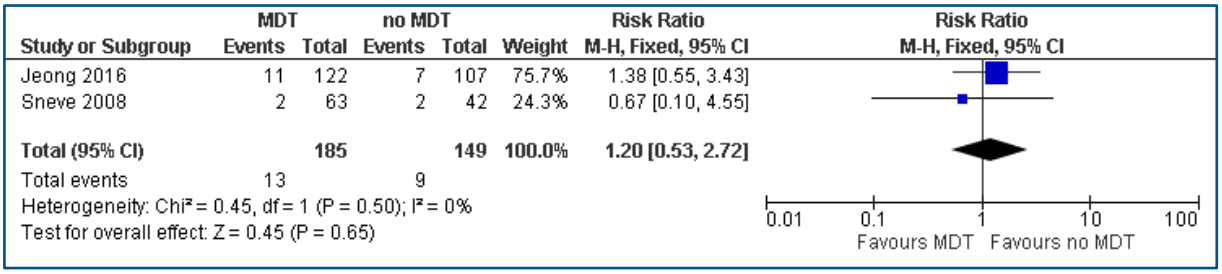


Figure 4: MDT versus no MDT; Necrotising enterocolitis



Appendix F – GRADE tables

GRADE tables for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Table 5: Clinical evidence profile for MDT versus no MDT

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	MDT	No MDT	Relative (95% CI)	Absolute	Quality	Importance
Weight: z score at discharge (Better indicated by higher values)												
1	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	122	107	-	MD 0.16 higher (0.1 lower to 0.42 higher)	⊕OOO VERY LOW	CRITICAL
Weight at discharge (Better indicated by higher values)												
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	42	-	MD 503 higher (327.23 to 678.77 higher)	⊕OOO VERY LOW	CRITICAL
Weight: change in z score (Better indicated by higher values)												
1	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	122	107	-	MD 0.22 higher (0.01 lower to 0.45 higher)	⊕OOO VERY LOW	CRITICAL
Weight gained (Better indicated by higher values)												
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	serious[3]	none	63	42	-	MD 478 higher (212.27 to 743.73 higher)	⊕OOO VERY LOW	CRITICAL
Head circumference growth (Better indicated by higher values)												
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	serious[4]	none	63	42	-	MD 2 higher (0.91 to 3.09 higher)	⊕OOO VERY LOW	CRITICAL
Head circumference at discharge (Better indicated by higher values)												

Quality assessment							No of patients		Effect			
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**MDT**	**No MDT**	**Relative (95% CI)**	**Absolute**	**Quality**	**Importance**
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	42	-	MD 2 higher (1.46 to 2.54 higher)	⊕OOO VERY LOW	CRITICAL
Total length growth (Better indicated by higher values)												
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	42	-	MD 1 higher (1.08 lower to 3.08 higher)	⊕OOO VERY LOW	CRITICAL
Length at discharge (Better indicated by higher values)												
1	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	serious[5]	none	63	42	-	MD 2 higher (0.77 to 3.23 higher)	⊕OOO VERY LOW	CRITICAL
Length of stay - Babies with intestinal failure (Better indicated by lower values)												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	serious[7]	none	28	27	-	MD 10 lower (49.73 lower to 29.73 higher)	⊕OOO VERY LOW	IMPORTANT
Length of stay - Babies with Gastroschisis (Better indicated by lower values)												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	no serious imprecision	none	204	192	-	MD 13 higher (2.34 to 23.66 higher)	⊕OOO VERY LOW	IMPORTANT
Length of stay - Non-complex babies (Better indicated by lower values)												
2	observational studies	very serious[2]	very serious[8]	no serious indirectness	serious[9]	none	185	149	-	MD 1.57 lower (17.74 lower to 14.6 higher)	⊕OOO VERY LOW	IMPORTANT
Energy greater than 80kcal/kg on day 7												
1	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	serious[10]	none	77/122 (63.1%)	45/107 (42.1%)	RR 1.5 (1.16 to 1.95)	210 more per 1000 (from 67 more to 400 more)	⊕OOO VERY LOW	CRITICAL
Duration of PN - Babies with intestinal failure (Better indicated by lower values)												

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	MDT	No MDT	Relative (95% CI)	Absolute	Quality	Importance
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	serious[11]	none	28	27	-	MD 63.7 higher (20.34 to 107.06 higher)	⊕OOO VERY LOW	IMPORTANT
Duration of PN - Babies with gastroschisis (Better indicated by lower values)												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	serious[12]	none	204	192	-	MD 13 higher (4.59 to 21.41 higher)	⊕OOO VERY LOW	IMPORTANT
Duration of PN - Non-complex babies (Better indicated by lower values)												
1	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	122	107	-	MD 4.4 lower (9.31 lower to 0.51 higher)	⊕OOO VERY LOW	IMPORTANT
Mortality - Babies with intestinal failure												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	very serious[13]	none	2/28 (7.1%)	4/27 (14.8%)	RR 0.48 (0.1 to 2.42)	77 fewer per 1000 (from 133 fewer to 210 more)	⊕OOO VERY LOW	IMPORTANT
Mortality - Babies with gastroschisis												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	very serious[13]	none	5/204 (2.5%)	10/192 (5.2%)	RR 0.47 (0.16 to 1.35)	28 fewer per 1000 (from 44 fewer to 18 more)	⊕OOO VERY LOW	IMPORTANT
Mortality - Non-complex babies												
2	observational studies	very serious[2]	serious	no serious indirectness	very serious[13]	none	20/185 (10.8%)	8/149 (5.4%)	RR 1.94 (0.47 to 8.09)	50 more per 1000 (from 28 fewer to 381 more)	⊕OOO VERY LOW	IMPORTANT
NEC												
2	observational studies	very serious[2]	no serious inconsistency	no serious indirectness	very serious[13]	none	13/185 (7%)	9/149 (6%)	RR 1.20 (0.53 to 2.72)	12 more per 1000 (from 29 fewer to 104 more)	⊕OOO VERY LOW	IMPORTANT
Sepsis												

Quality assessment							No of patients		Effect			
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**MDT**	**No MDT**	**Relative (95% CI)**	**Absolute**	**Quality**	**Importance**
1	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	very serious[13]	none	36/122 (29.5%)	26/107 (24.3%)	RR 1.21 (0.79 to 1.87)	51 more per 1000 (from 51 fewer to 211 more)	⊕OOO VERY LOW	IMPORTANT
Number of babies with at least 1 septic episode												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	serious[10]	none	24/28 (85.7%)	18/27 (66.7%)	RR 1.29 (0.95 to 1.75)	193 more per 1000 (from 33 fewer to 500 more)	⊕OOO VERY LOW	IMPORTANT
Mean number of septic episodes per baby (Better indicated by lower values)												
1	observational studies	very serious[6]	no serious inconsistency	no serious indirectness	very serious[14]	none	28	27	-	MD 0 higher (1.35 lower to 1.35 higher)	⊕OOO VERY LOW	IMPORTANT

CI: confidence interval; MD: mean difference; MDT: multidisciplinary team; PN: parenteral nutrition; RR: risk ratio.

[1] Very serious risk of bias due to moderate risk of confounding bias, and deviations from intended interventions, plus unclear risk of measurement bias.

[2] Very serious risk of bias due to serious risk of confounding bias, deviations from intended interventions, and selection of reported results. Unclear risk of bias from measurement bias.

[3] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (359).

[4] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (1.6).

[5] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (1.61).

[6] Very serious risk of bias due to serious risk of confounding bias, serious risk of classification bias, moderate risk of deviations from intended interventions, plus unclear risk of measurement bias.

[7] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (-30.4).

[8] Evidence downgraded due to heterogeneity in the data; I squared greater than 80%.

[9] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (17.66).

[10] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for dichotomous data (0.8 or 1.25).

[11] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (34.45).

[12] Evidence was downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (16.50).

[13] Evidence was downgraded by 2 due to very serious imprecision, 95% confidence interval crosses two default MID for dichotomous outcomes (0.8 and 1.25).

[14] *Evidence was downgraded by 2 due to very serious imprecision, 95% confidence interval crosses both default MID for continuous outcomes, calculated as 0.5 x SD control at baseline (-1.33 and 1.33).*

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

One global search was conducted for all review questions. See supplementary material D for further information.

Appendix H – Economic evidence tables

Economic evidence tables for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

No evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

No economic studies were identified which were applicable to this review question.

Appendix J – Economic analysis

Economic analysis for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

No economic analysis was undertaken for this review question.

Appendix K – Excluded studies

Excluded studies for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

Clinical studies

Table 6: Excluded studies and reasons for their exclusion

Study	Reason for Exclusion
Arumugam, V., Arunan, S. K., Balasubramanian, G. P., Paruchuri, S., A prospective study on medication and total parenteral nutrition practices at a Neonatal Intensive Care Unit, Archives of Pharmacy Practice, 7, 142-148, 2016	Study design and intervention do not meet protocol eligibility criteria; non-comparative, does not compare different nutrition care teams/individuals/no nutrition care team
Cooke, R. J., Improving growth in preterm infants during initial hospital stay: Principles into practice, Archives of Disease in Childhood: Fetal and Neonatal Edition, 101, F366-F370, 2016	Non-systematic review
Fisher, A. A., Poole, R. L., Machie, R., Tsang, C., Baugh, N., Utley, K., Kerner, J. A., Jr., Clinical pathway for pediatric parenteral nutrition, Nutrition in clinical practice : official publication of the American Society for Parenteral and Enteral Nutrition, 12, 76-80, 1997	Study design does not meet protocol eligibility criteria - no comparator; assesses implementation of a clinical pathway in single institution
Geukers, V. G., de Neef, M., Dijsselhof, M. E., Sauerwein, H. P., Bos, A. P., Effect of a nurse-driven feeding algorithm and the institution of a nutritional support team on energy and macronutrient intake in critically ill children, e-SPEN Journal, 7, e35-e40, 2012	Study intervention does not meet protocol eligibility criteria; main nutrition from EN
Gongwer, R. C., Gauvreau, K., Huh, S. Y., Sztam, K. A., Jenkins, K. J., Impact of a Standardized Clinical Assessment and Management Plan (SCAMP) on growth in infants with CHD, Cardiology in the Young, 28, 1093-1098, 2018	Population outside scope - older infants
Gurgueira, G. L., Leite, H. P., Taddei, J. A., de Carvalho, W. B., Outcomes in a pediatric intensive care unit before and after the implementation of a nutrition support team, Jpen, Journal of parenteral and enteral nutrition. 29, 176-185, 2005	Study population do not meet protocol eligibility criteria; Mean age greater than 3 months
Haddock, C., Al Maawali, A. G., Ting, J., Bedford, J., Afshar, K., Skarsgard, E. D., Impact of Multidisciplinary Standardization of Care for Gastroschisis: Treatment, Outcomes, and Cost, Journal of Pediatric Surgery, 53, 892-897, 2018	Study intervention does not meet protocol eligibility criteria; care for gastroschisis, focus not on PN
Johnson, Mark J., Leaf, Alison A., Pearson, Freya, Clark, Howard W., Dimitrov, Borislav D., Pope, Catherine, May, Carl R., Successfully implementing and embedding guidelines to improve the nutrition and growth of preterm infants in neonatal intensive care: a prospective interventional study, BMJ open, 7, e017727, 2017	Insufficient presentation of results for analysis

Study	Reason for Exclusion
Johnson, T., Sexton, E., Managing children and adolescents on parenteral nutrition: Challenges for the nutritional support team, Proceedings of the Nutrition Society, 65, 217-221, 2006	Non-systematic review
Kaufman, Jon, Vichayavilas, Piyagarnt, Rannie, Michael, Peyton, Christine, Carpenter, Esther, Hull, Danielle, Alpern, Jennifer, Barrett, Cindy, da Cruz, Eduardo M., Roosevelt, Genie, Improved nutrition delivery and nutrition status in critically ill children with heart disease, Pediatrics, 135, e717-25, 2015	Population do not meet the inclusion criteria; median age of 1.6 months
Koehler, A. N., Yaworski, J. A., Gardner, M., Kocoshis, S., Reyes, J., Barksdale, E. M., Jr., Coordinated interdisciplinary management of pediatric intestinal failure: a 2-year review, Journal of Pediatric Surgery, 35, 380-5, 2000	Study design does not meet protocol eligibility criteria; non-comparative study
Kuzma-O'Reilly, Barbara, Duenas, Maria L., Greecher, Coleen, Kimberlin, Lois, Mujsce, Dennis, Miller, Debra, Walker, Donna Jean, Evaluation, development, and implementation of potentially better practices in neonatal intensive care nutrition, Pediatrics, 111, e461-70, 2003	Study design and intervention do not meet protocol eligibility criteria; non-comparative study with a focus on enteral nutrition
Merras-Salmio, L., Pakarinen, M. P., Refined Multidisciplinary Protocol-Based Approach to Short Bowel Syndrome Improves Outcomes, Journal of Pediatric Gastroenterology and Nutrition, 61, 24-29, 2015	Study intervention does not meet protocol eligibility criteria; changes in EN protocol
Modi, Biren P., Langer, Monica, Ching, Y. Avery, Valim, Clarissa, Waterford, Stephen D., Iglesias, Julie, Duro, Debora, Lo, Clifford, Jaksic, Tom, Duggan, Christopher, Improved survival in a multidisciplinary short bowel syndrome program, Journal of Pediatric Surgery, 43, 20-4, 2008	Study design does not meet protocol eligibility criteria; non-comparative study
Muir, A., Holden, C., Sexton, E., Gray, J. W., Preventing bloodstream infection in patients receiving home parenteral nutrition, Journal of Pediatric Gastroenterology and Nutrition, 59, 177-181, 2014	Study intervention does not meet protocol eligibility criteria; enhanced clinical pathway that does not focus on PN
Olsen, Irene E., Richardson, Douglas K., Schmid, Christopher H., Ausman, Lynne M., Dwyer, Johanna T., Dietitian involvement in the neonatal intensive care unit: more is better, Journal of the American Dietetic Association, 105, 1224-30, 2005	Study design does not meet inclusion criteria - cross sectional study
Sigalet, David, Boctor, Dana, Brindle, Mary, Lam, Viona, Robertson, Marli, Elements of successful intestinal rehabilitation, Journal of Pediatric Surgery, 46, 150-6, 2011	Study intervention does not meet protocol eligibility criteria; study assesses pre- and post-implementation of standardised protocol

Economic studies

No economic evidence was identified for this review question. See supplementary material D for further information.

Appendix L – Research recommendations

Research recommendations for review question: Are nutrition care/support teams effective in providing parenteral nutrition in preterm and term babies?

No research recommendations were made for this review question.