EtD 36. Should routine glucose polymer supplementation vs. no supplementation be used in preterm infants receiving enteral feeds?

POPULATION:	Preterm infants receiving enteral feeds
INTERVENTION:	Routine glucose polymer supplementation
COMPARISON:	No glucose polymer supplementation
MAIN OUTCOMES:	**Critical outcomes** Faltering growth/body composition Necrotising enterocolitis Adverse effects (long term cardiometabolic health) Time to full enteral feeds **Important but not critical** Neurodevelopmental impairment Duration of initial hospital stay Fully breastfed or breastmilk feeding at hospital discharge Sepsis: proven or suspected Mortality Bronchopulmonary dysplasia Retinopathy of prematurity Anaemia of prematurity Cost: cost of intervention, cost of neonatal care and life-long cost **Less important for decision making** Time to full sucking feeds Growth/weight at day 30 Feeding intolerance Necrotising enterocolitis
SETTING:	Neonatal care
PERSPECTIVE:	Clinical recommendation
BACKGROUND:	Adequate nutrition is crucial for preterm infants to support growth, neurodevelopment, and overall clinical outcomes. Carbohydrate is an important energy source, contributing significantly to energy intake and supporting metabolic processes. In preterm infants, achieving sufficient energy intake for growth is often challenging due to their immature gastrointestinal systems and limited feeding tolerance. Carbohydrate supplementation in enteral feeds enhances energy provision and promotes weight gain. However, the balance between meeting energy needs and avoiding potential complications is critical. Excessive carbohydrate intake can lead to hyperglycaemia, increased insulin demand, and fat deposition, while inadequate carbohydrate and energy intake may impair growth and neurodevelopment. The impact of additional carbohydrate supplementation on clinical outcomes, including rates of necrotising enterocolitis and gastrointestinal tolerance, remains poorly understood. Potential benefits of supplementation include improved weight gain and growth velocity, while risks may include feeding intolerance, hyperglycaemia or osmotic diarrhoea.

	Evidence regarding the long-term effects of carbohydrate supplementation on neurodevelopment and metabolic health in preterm infants is limited. Providing the optimal quantity of carbohydrates to supplement enteral feeds, ensuring that energy requirements are met without increasing the risk of adverse clinical and long-term metabolic outcomes is crucial.
CONFLICT OF INTERESTS:	The following 2018 Cochrane systematic review (Amissah *et al)* co-author wrote this Evidence to Decision document: Julie Brown

Assessment

Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Trivial ○ Small ○ Moderate ○ Large ○ Varies ● Don't know	**No randomised controlled trial evidence was found to answer this clinical question.** A 2018 Cochrane systematic review on this topic found no studies eligible for inclusion except an unblinded, quasi-RCT assessing the effects of carbohydrate in the form of a prebiotic added to breastmilk in (n=75) preterm infants. This search was updated by our team. One study [1] was found on glucose polymers added to the feeds of 14 VLBW infants (<1,500 g) who were supplemented with a glucose polymer (6 g/kg body weight/day). Seven-day periods of supplementation were alternated with seven-day periods of unsupplemented feeding. Adding the glucose polymer significantly increased the rate of weight gain in these infants from 105 g/week to 140 g/week; length and head circumference growth rates were not affected.	**Despite a lack of evidence, carbohydrate in the form of glucose polymer powder has been added to feeds for preterm infants to improve their growth.** Glucose polymer powder is a fine white powder derived from the controlled hydrolysis of corn starch. It is tasteless, low in electrolytes and low in osmolality, which lessens the potential for osmotic diarrhoea. It is generally well tolerated in small amounts, e.g. 3 g/100 mL. Glucose polymer powder contains 3.8 kcal per g.

Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS

○ Trivial ○ Small ○ Moderate ○ Large ○ Varies ● Don't know	The Raffles *et al* study indicates that the addition of carbohydrate to feeds is likely to increase weight, but not length and head circumference growth, which may not be beneficial for long-term health.	Glucose polymers provide high energy densities without increasing the osmotic load and unlike lactose, they are better absorbed, as they do not require lactase for digestion but are dependent on glucoamylase, which is available in sufficient quantities. However, in preterm infants, it is recommended that lactose should account for 40% to 100% of the carbohydrate intake, as it is needed to aid mineral absorption and to foster prebiotic and lactase activities.

Certainty of evidence

What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
● Very low ○ Low ○ Moderate ○ High ○ No included studies	Very low	

Values

Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Important uncertainty or variability ○ Possibly important uncertainty or variability ● Probably no important uncertainty or variability ○ No important uncertainty or variability		

Balance of effects

Does the balance between desirable and undesirable effects favour the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Favours the comparison ○ Probably favours the comparison ○ Does not favour either the intervention or the comparison ○ Probably favours the intervention ○ Favours the intervention ○ Varies ● Don't know	We found insufficient evidence on the short- and long-term effects of glucose polymer supplementation of breastmilk in preterm infants.	

Resources required

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Large costs ○ Moderate costs ● Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ○ Don't know	The cost of glucose polymer powder is minimal.	

Certainty of evidence of required resources

What is the certainty of the evidence of resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Very low ○ Low ○ Moderate ● High	Costs are certain.	

○ No included studies		

Cost effectiveness

Does the cost-effectiveness of the intervention favour the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Favours the comparison ○ Probably favours the comparison ○ Does not favour either the intervention or the comparison ○ Probably favours the intervention ○ Favours the intervention ○ Varies ● No included studies	No studies found.	

Equity

What would be the impact on health equity?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Reduced ○ Probably reduced ○ Probably no impact ○ Probably increased ○ Increased ○ Varies ● Don't know	**Equity for Māori** Pēpi Māori are more likely to experience growth restriction and suboptimal health outcomes due to systemic inequities in neonatal care. If carbohydrate supplementation is offered inconsistently or without a clear explanation, pēpi Māori may miss out on its potential benefits for growth and energy balance. Whānau Māori may not be included in discussions about the risks and benefits of supplementation, particularly where care is not culturally safe or communication is unclear. Equity requires standardised nutritional practices, equitable access to supplementation and respectful engagement with whānau Māori to ensure pēpi Māori receive the nutrition support needed for healthy development. **Equity for Pacific families** Pacific families may not receive clear explanations about carbohydrate supplementation or how it supports growth and energy needs in preterm infants. Without culturally appropriate information, its importance may be misunderstood. Equity requires accessible, respectful communication and	

	consistent access to supplementation to support optimal outcomes for Pacific infants. **Equity for underrepresented groups** Underrepresented families may face barriers in accessing carbohydrate supplements or understanding their purpose, particularly where language and resource gaps exist. Equity demands standardised nutritional practices and inclusive education that ensures all families are informed and empowered to support their infants' nutritional needs.	

Acceptability

Is the intervention acceptable to key interest-holders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ○ Probably yes ○ Yes ● Varies ○ Don't know	May not be acceptable to all staff and parents.	

Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know	Has been in practice for many years.	

Summary of judgements

	JUDGEMENT						
DESIRABLE EFFECTS	Trivial	Small	Moderate	Large		Varies	**Don't know**
UNDESIRABLE	Trivial	Small	Moderate	Large		Varies	**Don't know**

	JUDGEMENT						
EFFECTS							
CERTAINTY OF EVIDENCE	**Very low**	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	**Probably no important uncertainty or variability**	No important uncertainty or variability			
BALANCE OF EFFECTS	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the comparison	Probably favours the intervention	Favours the intervention	Varies	**Don't know**
RESOURCES REQUIRED	Large costs	Moderate costs	**Negligible costs and savings**	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	**High**			No included studies
COST EFFECTIVENESS	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the comparison	Probably favours the intervention	Favours the intervention	Varies	**No included studies**
EQUITY	Reduced	Probably reduced	Probably no impact	Probably increased	Increased	Varies	**Don't know**
ACCEPTABILITY	No	Probably no	Probably yes	Yes		**Varies**	Don't know
FEASIBILITY	No	Probably no	**Probably yes**	Yes		Varies	Don't know

Type of recommendation

Strong recommendation against the intervention	**Conditional recommendation against the intervention**	Conditional recommendation for either the intervention or the comparison	Conditional recommendation for the intervention	Strong recommendation for the intervention
○	●	○	○	○

References

1. Raffles, A.; Schiller, G.; Erhardt, P.; Silverman, M. Glucose polymer supplementation of feeds for very low birthweight infants. *Br. Med. J. (Clin. Res. Ed)* **1983**, *286*, 935-936, doi:10.1136/bmj.286.6369.935.

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