EtD 39. In preterm infants who are enterally fed does routine zinc supplementation and monitoring compared with routine no supplementation and zinc monitoring reduce the incidence of zinc deficiency faltering growth, reduced immune function and impaired neurodevelopment?

POPULATION:	Preterm infants who are enterally fed
INTERVENTION:	Routine zinc supplementation or monitoring
COMPARISON:	no routine zinc supplementation or monitoring
MAIN OUTCOMES:	**Critical outcomes** Mortality Neurodevelopmental impairment Faltering growth/body composition – especially length growth Sepsis: proven or suspected Retinopathy of prematurity **Important but not critical** Adverse effects Time to full enteral feeds Duration of initial hospital stay Fully breastfed or breastmilk feeding at hospital discharge Bronchopulmonary dysplasia Necrotising enterocolitis 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
SETTING:	Neonatal care
PERSPECTIVE:	Clinical recommendation
BACKGROUND:	Zinc is a critical trace element for numerous physiological functions, including cell division, protein synthesis, and immune function. It plays a vital role in growth and neurodevelopment, making it particularly important for preterm infants, who have high nutritional demands and low body stores at birth. Zinc deficiency in preterm infants is associated with higher mortality, faltering growth, compromised immune responses, impaired neurodevelopment and skin rashes. Routine zinc supplementation for enterally fed preterm infants may help prevent deficiency by compensating for their limited stores. Additionally, zinc has immunomodulatory properties that could reduce the risk of infections, a common concern in preterm infants. If breastmilk fed, the preterm infant's mother's zinc status may also be important. Vegan and vegetarian mothers are at high risk of zinc deficiency, one of the causes of preterm birth. Zinc monitoring is one way to avoid zinc overload which may lead to zinc toxicity and adverse effects such as impaired copper absorption. Current practices for zinc monitoring and supplementation vary across neonatal units, reflecting uncertainty about the optimal approach. Zinc is being considered separately for this guideline, but in combination European

	Consensus (ESPGHAN 2022) recommended nutrient intakes because Aotearoa New Zealand soil is zinc deficient. Preterm infants at higher risk of symptomatic zinc deficiency are those with faltering growth, and infants who have an enterostomy after gastrointestinal surgery. This question relates to zinc supplementation that is given in addition to, or instead of commercial breastmilk fortifier, to increase zinc intake.
CONFLICT OF INTERESTS:	None

Assessment

Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know	ESPGHAN 2022 recommended enteral nutrient intake for zinc is 2.0-3.0 mg/kg/day ESPGHAN 2022 also have a good practice point: Measurement of serum zinc should be considered in preterm infants with poor growth and low alkaline phosphatase level, especially if they have excessive GI fluid losses [1](2). Evidence is based on 3 systematic reviews of randomised/quasi-randomised trials [2-4]. **Mortality:** RCT: Large decrease in mortality for zinc supplementation (76 fewer per 1,000; 116 fewer to 5 fewer), the effect was greater in studies provided >3 mg/kg/day of zinc. No significant effect on all-cause mortality (8 fewer per 1,000; 15 fewer to 5 more) [Critical]. **Neurodevelopmental impairment:** RCT: Higher Bayley Scale of Infant Development version 1 (BSID I) mental development scores for zinc supplementation (MD 4.18 points higher; 6.51 higher to 1.85 higher); Moderate increase for BSID psychomotor development scores (MD 5.75 points higher; 4.83 higher to 16.33 higher). [Critical]. No significant effect for Griffith total neurodevelopmental score (MD 6.41 points higher; 2.35 lower to 15.17 higher) and large increase in Griffith motor developmental score (MD 9.54 points higher; 6.63 higher to 12.44 higher) [Critical]. **No faltering growth/body composition:** RCT: Large increase in weight gain (MD 378.6 g higher; 275.26 higher to 481.88 higher); (standardised mean difference (SMD) 0.46 standard deviation (SD) higher; 0.28 higher to 0.64 higher), (MD 0.5 z score points higher; 0.23 higher to 0.76 higher). [Critical]. The effect of zinc supplementation on weight was significantly higher in studies provided >3 mg/kg per day of zinc. Large increase in length (MD 2.92 cm higher; 1.53 higher to 4.31 higher), (SMD 0.75 SD higher; 0.36 higher to 1.14 higher), (MD 1.12 z score points higher; 0.63 higher to 1.61 higher). [Critical] No significant increase in head circumference (SMD 0.21 SD higher; 0.02 lower to 0.44 higher), moderate increase in head circumference (MD 0.56 cm higher; 0.23 higher to 0.9 higher) [Critical] **Retinopathy of prematurity:** RCT: Zinc supplementation did not significantly decrease the risk of retinopathy of prematurity (27 fewer per 1,000; 31 fewer to 53 more) [Critical].	There is some overlap in the included trials in the 3 included systematic reviews. **Population information for included evidence** Staub *et al* [3] included 5 RCTs (481 infants). Four included studies used doses of zinc <3 mg/kg/day. Supplementation was for more than four weeks in all studies. Sinha *et al* [4] included 14 trials (9940 infants) of low birthweight or preterm infants. 12 RCTs, 1 cluster randomised and 1 quasi-randomised. This review may include indirect evidence as term LBW infants were included. Two trials provided <3 mg per day, 10 trials provided 3 to 5 mg per day, and 4 trials provided >5 mg per day of elemental zinc to the infants. The time of start of intervention ranged from birth to 5.2 weeks and the median (interquartile range [IQR]) duration of supplementation was 140.7 days (98 to 182.7 days). Alshaikh [2] included 8 RCTs (742 infants) in preterm

	Adverse effects: RCT: Large reduction in diarrhoea with zinc supplementation (26 fewer per 1000; 43 fewer to 4 fewer) [Important]. **Bronchopulmonary dysplasia**: RCT: Zinc supplementation did not significantly decrease the risk of bronchopulmonary dysplasia (53 fewer per 1,000; 108 fewer to 62 more) [Important] **Necrotising enterocolitis** (NEC): RCT: Zinc supplementation did not significantly decrease the risk of NEC (58 fewer per 1,000; 63 fewer to 21 more) [Important]. **Benefits for Māori** No additional evidence	infants. Three of the eight studies included only very low birthweight (VLBW) infants while the remainder included mostly late-preterm infants. Five studies included preterm small-for-gestational-age infants in their studies while the remainder excluded those infants. Age of starting zinc supplementation varied between the studies from 1 day to 1 month of age. In 6 of the trials, infants in the zinc group received ~2–3 mg/kg/day. In two trials the dose was 10-11 mg/day. **Serum zinc levels at end of intervention** *(LabPlus Reference serum zinc range 9-17 µmol/L)* Staub (2021): significantly higher blood zinc level at the end of the intervention in the intervention group (MD 3.6 µmol/L higher, 95% CI 2.7 to 4.5; 3 RCTs, n=189 infants) Alshaikh (2022): significantly higher blood zinc level at 3 months corrected age (WMD 3.6 µmol/L, 95% CI 3.1 to 4.1, 4 trials, n = 276 infants). **Very low birthweight infants (<1,500 g)** - Two trials included VLBW infants and the pooled effects were consistent with the overall meta-analysis for mortality, bacterial sepsis, weight gain, linear growth and head growth. The data from the small number of studies and events as well as large confidence intervals may be insufficient to determine an effect in the subgroups. An additional RCT from Turkey was identified [5] that compared supplementation of 3 mg/day zinc with an additional 9 mg/day (total 12 mg/day) in 195 very low birthweight infants <32 weeks' gestational age. The trial found that 46 (47.4%) infants in the high dose group and 64 (65.3%) infants in the low dose group had feeding intolerance (p=0.01). NEC was observed in 11 infants (11.2%) in the low dose

		group and only 1 infant (1%) in the high dose group (p=0.003). There was a negative correlation between high-dose zinc supplementation and number of culture-proven late onset sepsis episodes (p=0.04). No relationship between high-dose zinc supplementation and mortality, duration of hospital stay, bronchopulmonary dysplasia, and retinopathy of prematurity. Longer term neurodevelopmental outcome data are not available. An additional relevant implementation study by Seidu *et al* was identified after the search date for this question [6]. The study was conducted in the USA with very preterm (<33 weeks' gestation), very low birthweight (<1,500 g) infants. In the pre-implementation epoch zinc was provided at 450 µg/kg/day (500 µg/kg/day for infants <1,000g with zinc deficiency) in parenteral nutrition. Those with risk factors for zinc deficiency or a known deficiency received 3 to 3.5 mg/kg/day enteral supplementation. In the post-implementation epoch infants received 500 µg/kg/day of zinc in parenteral nutrition (650 µg/kg/day if zinc deficient). Once at 140 mL/kg/day of enteral feeds, infants received routine enteral zinc supplementation to achieve a total of 2.5 mg/kg/day until 36 weeks' post menstrual age or discharge; total intake was slightly increased by 0.3–0.5 mg/kg/day (to a total dose of 2.7 to 3 mg/kg/day). In Epoch-2 vs. Epoch-1 Adjusted mean length Z score increased by 0.27 points [95% CI 0.13 to 0.42, P < 0.001]. No significant difference in weight or head circumference z scores. There was no significant difference between epochs for bronchopulmonary dysplasia, late onset sepsis, NEC, severe retinopathy of prematurity, or mortality.

		Retinopathy of prematurity was independently associated with the lowest serum zinc level [adjusted OR 0.042 (95% CI 0.006 to 0.306)].

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with no routine zinc monitoring or supplementation	Risk difference with routine zinc monitoring or supplementation
Mortality: RCT	345 (3 RCTs)	⨁⨁⨁◯ Moderate[a]	**RR 0.55** (0.31 to 0.97)	Study population	
				169 per 1,000	**76 fewer per 1,000** (116 fewer to 5 fewer)
Mortality: RCT assessed with: All-cause mortality	8801 (6 RCTs)	⨁⨁◯◯ Low[b]	**RR 0.73** (0.46 to 1.16)	Study population	
				28 per 1,000	**8 fewer per 1,000** (15 fewer to 5 more)
Neurodevelopmental impairment: RCT assessed with: Bayley Scale of Infant Development version 1 (BSID I) mental development scores	301 (2 RCTs)	⨁◯◯◯ Very low[b,c,d]	-	The mean neurodevelopmental impairment: RCT: Bayley I Mental Development score was **110.4 points**	MD **4.18 higher** (6.51 higher to 1.85 higher)
Neurodevelopmental impairment: RCT assessed with: Bayley Scale of Infant Development version 1 (BSID I) psychomotor development scores	301 (2 RCTs)	⨁◯◯◯ Very low[b,c,e]	-	The mean neurodevelopmental impairment: RCT: Bayley I Psychomotor Development score was **98.3 points**	MD **5.75 higher** (4.83 higher to 16.33 higher)
Neurodevelopmental impairment: RCT assessed with: Amiel- Tison scale	72 (1 RCT)	⨁◯◯◯ Very low[a,d,f]	-	In one trial of 72 infants the Amiel- Tison scale for measuring neurodevelopment was used and there was a reported RR of 0.09 for "hyperexcitability" (95% CI 0.01 to 0.7) and a RR of 0.22 for "brisk bicipital reflex" (95% CI 0.07 to 0.7), but alertness and attention was similar across groups (RR 0.47, 95% CI 0.05 to 4.99).	
Neurodevelopmental impairment: RCT assessed with: Griffith Scale Total neurodevelopmental score	114 (2 RCTs)	⨁◯◯◯ Very low[a,b,d,e]	-	The mean neurodevelopmental impairment: RCT: Griffith Scale Total Neurodevelopmental score was **not reported**	MD **6.41 higher** (2.35 lower to 15.17 higher)
Neurodevelopmental impairment: RCT assessed with: Griffith Scale Motor developmental score	114 (2 RCTs)	⨁⨁⨁◯ Moderate[a]	-	The mean neurodevelopmental impairment: RCT: Griffith Scale Motor Developmental score was **not reported**	MD **9.54 higher** (6.63 higher to 12.44 higher)
Faltering growth/body composition: RCT assessed with: weight gain	481 (5 RCTs)	⨁⨁⨁◯ Moderate[a]	-	The mean faltering growth/body composition: RCT **not applicable**	SMD **0.46 SD higher** (0.28 higher to 0.64 higher)
Faltering growth/body composition: RCT assessed with: weight gain (g) at a follow-up median 22 weeks	798 (8 RCTs)	⨁⨁⨁◯ Moderate[a]	-	The mean faltering growth/body composition: RCT was **5162.9 g**	MD **378.57 higher** (275.26 higher to 481.88 higher)

Faltering growth/body composition: RCT assessed with: weight z score 3-6 months	524 (7 RCTs)	⨁◯◯◯ Very low[a,b]	-	The mean faltering growth/body composition: RCT was **not reported**	MD **0.5 higher** (0.23 higher to 0.76 higher)
Faltering growth/body composition: RCT assessed with: Linear growth	289 (4 RCTs)	⨁◯◯◯ Very low[a,g,h]	-	The mean faltering growth/body composition: RCT **not applicable**	SMD **0.75 SD higher** (0.36 higher to 1.14 higher)
Faltering growth/body composition: RCT assessed with: length (cm) at a follow-up median 36 weeks	529 (6 RCTs)	⨁◯◯◯ Very low[a,b]	-	The mean faltering growth/body composition: RCT was **60.4 cm**	MD **2.92 higher** (1.53 higher to 4.31 higher)
Faltering growth/body composition: RCT assessed with: length z-score	524 (7 RCTs)	⨁◯◯◯ Very low[a,b]	-	The mean faltering growth/body composition: RCT was **not reported**	MD **1.12 higher** (0.63 higher to 1.61 higher)
Faltering growth/body composition: RCT assessed with: head growth	289 (4 RCTs)	⨁◯◯◯ Very low[a,e,h]	-	The mean faltering growth/body composition: RCT **not applicable**	SMD **0.21 SD higher** (0.02 lower to 0.44 higher)
Faltering growth/body composition: RCT assessed with: head growth (cm) at a follow-up median 20 weeks	466 (5 RCTs)	⨁⨁◯◯ Low[c]	-	The mean faltering growth/body composition: RCT was **37.8 cm**	MD **0.56 higher** (0.23 higher to 0.9 higher)
Sepsis: proven or suspected: RCT	293 (2 RCTs)	⨁⨁◯◯ Low[a,e]	**RR 1.11** (0.60 to 2.04)	Study population	
				116 per 1,000	**13 more per 1,000** (47 fewer to 121 more)
Retinopathy of prematurity: RCT	193 (1 RCT)	⨁◯◯◯ Very low[f,i]	**RR 0.14** (0.01 to 2.70)	Study population	
				31 per 1,000	**27 fewer per 1,000** (31 fewer to 53 more)
Adverse effects assessed with: Diarrhoea	Not reported (6 RCTs)	⨁⨁⨁◯ Moderate[a]	**RR 0.81** (0.68 to 0.97)	Study population	
				135 per 1,000	**26 fewer per 1,000** (43 fewer to 4 fewer)
Time to full enteral feeds - not measured	-	-	-	-	-
Duration of initial hospital stay: RCT assessed with: days	398 (2 RCTs)	⨁◯◯◯ Very low[a,i]	-	The mean duration of initial hospital stay: RCT was **28.35 days**	MD **3.49 higher** (7.11 lower to 14.08 higher)
Fully breastfed or breastmilk feeding at hospital discharge - not measured	-	-	-	-	-
Bronchopulmonary dysplasia / chronic lung disease: RCT	193 (1 RCT)	⨁◯◯◯ Very low[e,f]	**RR 0.66** (0.31 to 1.40)	Study population	
				156 per 1,000	**53 fewer per 1,000** (108 fewer to 62 more)
Necrotising enterocolitis: RCT	193 (1 RCT)	⨁◯◯◯ Very low[f,i]	**RR 0.08** (0.00 to 1.33)	Study population	
				63 per 1,000	**58 fewer per 1,000**

					(63 fewer to 21 more)
Anaemia of prematurity - not measured	-	-	-	-	-
Cost: cost of intervention, cost of neonatal care and life-long cost - not measured	-	-	-	-	-
Time to full sucking feeds - not measured	-	-	-	-	-

a. Downgraded one level for concerns regarding risk of bias
b. Downgraded two levels for serious inconsistency
c. Downgraded two levels for serious concerns regarding risk of bias - all studies were low quality
d. Downgraded one level for imprecision with wide confidence intervals
e. Downgraded one level for imprecision with confidence intervals crossing the line of no effect
f. Downgraded one level for indirectness as evidence is based on a single study
g. Downgraded one level for serious inconsistency
h. Downgraded one level for imprecision as n= <400
i. Downgraded two levels for imprecision with wide confidence intervals crossing the line of no effect

Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
● Trivial ○ Small ○ Moderate ○ Large ○ Varies ○ Don't know	**Sepsis: RCT:** There was no significant increase in sepsis for zinc supplementation (13 more per 1,000; 47 fewer to 121 more) [Critical]. **Duration of initial hospital stay**: RCT: There was no significant increase in duration of hospitalisation with zinc supplementation (MD 3.5 days higher; 7.1 lower to 14.1 higher) [Important]. **Undesirable effects for Māori** No additional data	

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	Moderate to very low certainty of evidence. **Certainty of evidence for Māori** No additional data	

Outcomes	Importance	Certainty of the evidence (GRADE)
Mortality: RCT	CRITICAL	⨁⨁⨁◯ Moderate
Mortality: RCT assessed with: All-cause mortality	CRITICAL	⨁⨁◯◯ Low
Neurodevelopmental impairment: RCT assessed with: Bayley Scale of Infant Development version 1 (BSID I) mental development scores Scale from: 1 to 100	CRITICAL	⨁◯◯◯ Very low
Neurodevelopmental impairment: RCT assessed with: Bayley Scale of Infant Development version 1 (BSID I) psychomotor development scores Scale from: 1 to 100	CRITICAL	⨁◯◯◯ Very low
Neurodevelopmental impairment: RCT assessed with: Amiel- Tison scale (maximum score for the assessment is 36 points)	CRITICAL	⨁◯◯◯ Very low
Neurodevelopmental impairment: RCT assessed with: Griffith Scale Total neurodevelopmental score Scale from: 0 to 200	CRITICAL	⨁◯◯◯ Very low
Neurodevelopmental impairment: RCT assessed with: Griffith Scale Motor developmental score Scale from: 0 to 200	CRITICAL	⨁⨁⨁◯ Moderate
Faltering growth/body composition: RCT assessed with: weight gain	CRITICAL	⨁⨁⨁◯ Moderate
Faltering growth/body composition: RCT assessed with: weight gain (g) at a follow-up median 22 weeks	CRITICAL	⨁⨁⨁◯ Moderate
Faltering growth/body composition: RCT assessed with: weight z score 3-6 months	CRITICAL	⨁◯◯◯ Very low
Faltering growth/body composition: RCT	CRITICAL	⨁◯◯◯

assessed with: Linear growth		Very low[a]
Faltering growth/body composition: RCT assessed with: length (cm) at a follow-up median 36 weeks	CRITICAL	⨁◯◯◯ Very low
Faltering growth/body composition: RCT assessed with: length z-score	CRITICAL	⨁◯◯◯ Very low
Faltering growth/body composition: RCT assessed with: head growth	CRITICAL	⨁◯◯◯ Very low
Faltering growth/body composition: RCT assessed with: head growth (cm) at a follow-up median 20 weeks	CRITICAL	⨁⨁◯◯ Low
Sepsis: proven or suspected: RCT	CRITICAL	⨁⨁◯◯ Low
Retinopathy of prematurity: RCT	CRITICAL	⨁◯◯◯ Very low
Adverse effects assessed with: Diarrhoea	IMPORTANT	⨁⨁⨁◯ Moderate
Time to full enteral feeds - not measured	IMPORTANT	-
Duration of initial hospital stay: RCT assessed with: days	IMPORTANT	⨁◯◯◯ Very low
Fully breastfed or breastmilk feeding at hospital discharge - not measured	IMPORTANT	-
Bronchopulmonary dysplasia / chronic lung disease: RCT	IMPORTANT	⨁◯◯◯ Very low
Necrotising enterocolitis: RCT	IMPORTANT	⨁◯◯◯ Very low
Anaemia of prematurity - not measured	IMPORTANT	-
Cost: cost of intervention, cost of neonatal care and life-long cost - not measured	IMPORTANT	-
Time to full sucking feeds - not measured	NOT IMPORTANT	-

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	Possibly important uncertainty or variability **Values for Māori** No additional data	

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	There is likely to be benefit for growth outcomes for zinc supplementation compared with no supplementation, but there is insufficient evidence for immune function and neurodevelopmental outcomes. There was no evidence for substantive harm with zinc supplementation. Serum zinc increased in infants who were supplemented, and this is important in Aotearoa New Zealand, where environmental zinc levels are known to be low. **Zinc supplementation compared with no supplementation - moderate certainty of evidence** Large decrease in mortality and adverse effects (diarrhoea) Large increase in weight Improvement in neurodevelopmental outcomes: Griffith motor developmental scale **Zinc supplementation compared with no supplementation - low certainty of evidence** Increase in head circumference	

○ Don't know	Uncertain effect on mortality, sepsis **Zinc supplementation compared with no supplementation - very low certainty of evidence** Increase in weight gain, length Improvement in neurodevelopmental outcomes (mental and psychomotor development) Uncertain effect on neurodevelopmental outcomes, head circumference, hospital stay, bronchopulmonary dysplasia, retinopathy of prematurity, necrotising enterocolitis **Balance of effects for Māori** No additional data	

Resources required

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Large costs ○ Moderate costs ● Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ○ Don't know	At a dose of 10 mg per day Clinician's Zinc Liquid (1 mg elemental zinc per drop) is approx. 1 drop = 0.05 mL and $11.62 for a 30 mL bottle. Therefore, 0.5 mL per day will cost $0.19 per day. **The cost of zinc supplementation is small to negligible.** **Resources required for Māori** No additional data	

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 ○ No included studies	Costs are based on the only PHARMAC-funded liquid zinc supplement approved for use in New Zealand hospitals. **Certainty of evidence of resource requirements for Māori** No evidence available.	

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	There are no studies that assess the specific cost-effectiveness of zinc supplementation vs. no supplementation, particularly in the context of preterm infants.	

○ Does not favour either the intervention or the comparison ● Probably favours the intervention ○ Favours the intervention ○ Varies ○ No included studies	**Cost effectiveness for Māori** No additional data	

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** While Aotearoa New Zealand is classified as a low-risk country for zinc deficiency at the population level, some studies suggest that certain groups may have low zinc intakes. Due to systemic inequities in food security and neonatal care, preterm pēpi Māori are at increased risk of zinc deficiency. This includes inconsistent monitoring and supplementation protocols, meaning pēpi Māori may not always receive timely or adequate zinc supplementation if not growing well. Whānau Māori may also experience limited access to culturally safe nutritional counselling, which can impact shared decision-making. **Equity for Pacific families** Aotearoa New Zealand research suggests that Pacific Island children may have low zinc intakes, and New Zealand soil is naturally low in zinc. Pacific Island infants are similarly at elevated risk of zinc deficiency, driven by higher rates of food insecurity and infection burden. Pacific families may face language barriers and reduced access to culturally appropriate nutrition support, which can limit engagement in supplementation decisions. Pacific families may not be routinely informed about zinc supplementation or the risks of deficiency in preterm infants. If screening and supplementation are inconsistently applied across services, Pacific infants may miss out. Equity requires standardised care, culturally appropriate communication and consistent monitoring to support growth and immune function. **Equity for underrepresented groups** Other at-risk groups include refugee, migrant, and some Asian communities, particularly where dietary zinc intake is low or disrupted. These populations often experience barriers in accessing healthcare, including neonatal nutritional care, and may not receive consistent or informed guidance on zinc needs. Equity requires equitable availability, regular screening and inclusive information to ensure all infants receive essential micronutrients.	

Acceptability

Is the intervention acceptable to key interest-holders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ○ Probably yes ● Yes ○ Varies ○ Don't know	Based on the growth benefits and known low levels of zinc in Aotearoa New Zealand soil, this is probably an acceptable intervention. More evidence is needed to identify neurodevelopmental benefits or harms. **Acceptability for Māori** No additional data	

Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ○ Probably yes ● Yes ○ Varies ○ Don't know	Zinc supplementation is feasible in Aotearoa New Zealand neonatal care. We are not aware of any Aotearoa New Zealand neonatal units that currently give routine supplementary enteral zinc, but some Australian hospitals do. There is testing for serum zinc if infants are not growing well or they have a stoma and if their serum zinc is low then supplements are given. **Feasibility for Māori** No additional data	

Summary of judgements

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

	JUDGEMENT						
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

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