EtD 22. Should routine gastric aspiration before feeds vs. no routine gastric aspiration before feeds be used for preterm infants who require enteral feeding?

POPULATION:	Preterm infants who require enteral feeding
INTERVENTION:	Routine gastric aspiration before feeds
COMPARISON:	No routine gastric aspiration before feeds
MAIN OUTCOMES:	**Critical outcomes** Mortality Necrotising enterocolitis Time to full enteral feeds Duration of initial hospital stay Fully breastfed or breastmilk feeding at hospital discharge Faltering growth/body composition Sepsis: proven or suspected Adverse effects **Important but not critical** Neurodevelopmental impairment 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
SETTING:	Neonatal care
PERSPECTIVE:	Clinical recommendation
BACKGROUND:	In neonatal care, it is common to check how much milk remains in an infant's stomach before their next feed by aspirating it through a feeding tube. This is done to see if the infant is tolerating their feeds, as a large volume of leftover milk or unusual coloured aspirate might indicate feeding problems or necrotising enterocolitis, a serious condition in preterm infants. If concerns arise, feeds may be reduced or stopped to lower these risks. However, this practice is debated. Stomach contents can vary a lot and don't always reliably signal feed intolerance or necrotising enterocolitis. Routine gastric aspiration may disrupt the gastrointestinal tract's natural processes, delay the progression of enteral feeds and increase the risk of infection due to frequent handling of feeding tubes. Additionally, withholding feeds based on aspiration findings could prolong dependence on parenteral nutrition, increasing the risks of associated complications such as infection and liver dysfunction. It is also unclear whether the gastric aspirate should be returned to the infant's stomach or discarded. The absence of routine gastric aspiration has been associated with more rapid advancement to full enteral feeding and earlier discharge in some studies. However, concerns remain about the

	potential for missed early signs of necrotising enterocolitis in the absence of routine aspiration.
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	Evidence is based on two Cochrane systematic reviews [1,2]. **Re-feeding gastric residual compared with discarding the gastric residual** **Mortality:** RCT: No significant reduction on all-cause mortality before hospital discharge for re-feeding gastric residuals (83 fewer deaths per 1,000; 143 fewer to 142 more) [Critical]. **Necrotising enterocolitis:** RCT: No significant reduction on risk of necrotising enterocolitis stage ≥ 2 or spontaneous intestinal perforation with re-feeding gastric residuals (56 fewer per 1,000; 146 fewer to 202 more) [Critical]. **Time to reach full enteral feeds:** RCT: No significant reduction in time to establish enteral feeds ≥ 120 mL/kg/day for re-feeding gastric residuals (MD 1.3 days lower; 2.93 lower to 0.33 higher) [Critical]. **Duration of initial hospital stay:** RCT: No significant reduction in duration of hospital stay with re-feeding gastric residuals (MD 1.9 days lower; 25.27 lower to 21.47 higher) [Critical]. **No faltering growth/body composition:** RCT: No significant effect in time to regain birthweight for re-feeding gastric residuals may result in (MD 0.4 days higher; 2.89 lower to 3.69 higher) [Critical]. **Quality and volume of gastric aspirate compared with quality alone** **Time to reach full enteral feeds:** RCT: Little or no effect on time to establish full enteral feeds between using quality and volume of gastric aspirate compared with quality alone (MD -0.10 days, 0.91 lower to 0.71 higher) [Critical].	**Population information for included evidence** Routine monitoring versus no routine monitoring of gastric residual in preterm infants [2]. Cochrane systematic review. Three studies were performed in infants with birthweight of <1,500 g, while one study included infants with birthweight between 750 g and 2,000 g. The trials were unmasked but were otherwise of good methodological quality. Quality and volume of gastric residual compared to quality of gastric residual alone for feed interruption in preterm infants [2]. Cochrane systematic review. One trial with 87 preterm infants met the inclusion criteria for this comparison. The trial included infants with 1,500 g to 2,000 g birthweight. Re-feeding versus discarding gastric residuals in preterm infants [1]. Systematic review: Preterm infants (23 to 28 weeks' gestation).

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with the absence of regular gastric aspiration before feeds	Risk difference with routine gastric aspiration before feeds
Mortality: RCT: assessed with: All-cause mortality before hospital discharge: Refeed/discard	72 (1 RCT)	⨁◯◯◯ Very low[a,b]	**RR 0.50** (0.14 to 1.85)	Study population	
				167 per 1,000	**83 fewer per 1,000**

					(143 fewer to 142 more)
Mortality: RCT assessed with: All-cause mortality before discharge: Quality + Volume/quality	87 (1 RCT)	⨁◯◯◯ Very low[a,c]	**RR 3.21** (0.13 to 76.67)	Study population	
				0 per 1,000	**Not estimable**
Mortality: RCT assessed with: All-cause mortality before discharge: Monitor/not monitor	80 (1 RCT)	⨁◯◯◯ Very low[b,d]	**RR 1.25** (0.36 to 4.32)	Study population	
				100 per 1,000	**25 more per 1,000** (64 fewer to 332 more)
Necrotising enterocolitis: RCT assessed with: Refeed/discard	72 (1 RCT)	⨁◯◯◯ Very low[a,b]	**RR 0.71** (0.25 to 2.04)	Study population	
				194 per 1,000	**56 fewer per 1,000** (146 fewer to 202 more)
Necrotising enterocolitis: RCT assessed with: Quality + Volume/quality	87 (1 RCT)	⨁◯◯◯ Very low[a,e]	**RR 5.35** (0.26 to 108.27)	Study population	
				0 per 1,000	**Not estimable**
Necrotising enterocolitis: RCT assessed with: Monitor/not monitor	141 (2 RCTs)	⨁◯◯◯ Very low[d,e]	**RR 3.07** (0.50 to 18.77)	Study population	
				14 per 1,000	**29 more per 1,000** (7 fewer to 250 more)
Time to full enteral feeds: RCT assessed with: Time to establish full enteral feeds (120 mL/kg/day) Days: Refeed/discard	59 (1 RCT)	⨁◯◯◯ Very low[a,b]	-	The mean time to full enteral feeds: RCT was **11.3 days**	MD **1.3 lower** (2.93 lower to 0.33 higher)
Time to full enteral feeds: RCT assessed with: Days; monitoring/no monitoring	141 (2 RCTs)	⨁⨁⨁◯ Moderate[d]	-	The mean time to full enteral feeds: RCT was **17.05 days**	MD **3.92 higher** (2.06 higher to 5.77 higher)
Time to full enteral feeds: RCT assessed with: Days; Quality + Volume/quality	87 (1 RCT)	⨁◯◯◯ Very low[a,b]	-	The mean time to full enteral feeds: RCT was **7.1 days**	MD **0.1 lower** (0.91 lower to 0.71 higher)
Duration of initial hospital stay: RCT assessed with: Days: Refeed/discard	59 (1 RCT)	⨁◯◯◯ Very low[a,c]	-	The mean duration of initial hospital stay: RCT was **93.5 days**	MD **1.9 lower** (25.27 lower to 21.47 higher)
Duration of initial hospital stay: RCT assessed with: Days: Monitoring/no monitoring	80 (1 RCT)	⨁◯◯◯ Very low[a,c,d]	-	The mean duration of initial hospital stay: RCT was **31.3 days**	MD **3.2 higher** (4.45 lower to 10.85 higher)
Fully breastfed or breastmilk feeding at hospital discharge - not measured	-	-	-	-	-
Faltering growth/body composition: RCT: Refeed/discard assessed with: Time to regain birthweight (days)	59 (1 RCT)	⨁◯◯◯ Very low[a,c]	-	The mean faltering growth/body composition: RCT: Refeed/discard was **14.5 days**	MD **0.4 higher** (2.89 lower to 3.69 higher)
Faltering growth/body composition assessed with: Time to regain birthweight (days); monitoring/no monitoring	80 (1 RCT)	⨁◯◯◯ Very low[a,d]	-	The mean faltering growth/body composition was **9.8 days**	MD **1.7 higher** (0.01 higher to 3.39 higher)

Faltering growth/body composition assessed with: Time to regain birthweight (days); Quality + Volume/quality	87 (1 RCT)	⨁◯◯◯ Very low[a,b]	-	The mean faltering growth/body composition was **11 days**	MD **1 higher** (0.37 lower to 2.37 higher)
Sepsis: proven or suspected - not measured	-	-	-	-	-
Adverse effects - not measured	-	-	-	-	
				-	-
Neurodevelopmental impairment - not measured	-	-	-	-	-
Bronchopulmonary dysplasia - not measured	-	-	-	-	-
Retinopathy of prematurity - not measured	-	-	-	-	-
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 indirectness as evidence is based on a single trial
b. Downgraded one level for imprecision with confidence intervals crossing the line of no effect
c. Downgraded two levels for extremely wide confidence intervals that cross the line of no effect
d. Downgraded one level for concerns for risk of bias
e. Downgraded two levels for imprecision due to extremely wide confidence intervals that cross the line of no effect; downgraded one level for imprecision due to very low/no event rates

Desirable effects for Māori
No additional evidence available

Undesirable Effects
How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know	**Routine monitoring compared with no monitoring** **Mortality: RCT:** No significant increase for all-cause mortality before hospital discharge for routine monitoring of gastric residual (25 more deaths per 1,000; 64 fewer to 332 more) [Critical]. **Necrotising enterocolitis:** RCT: No significant increase in risk of NEC for routine monitoring of gastric residual (19 more per 1,000; 7 fewer to 250 more) [Critical]. **Time to reach full enteral feeds:** RCT: Large increase in the time to establish full enteral feeds for routine monitoring of gastric residual (MD 3.92 days higher, 2.063 higher to 5.77 higher) [Critical]. **Duration of initial hospital stay:** RCT: No significant increase in duration of hospital stay	Abiramalatha 2023b **Routine monitoring versus no routine monitoring of gastric residual in preterm infants** Four RCTs with 336 preterm infants met the inclusion criteria for this comparison. Three studies were performed in infants with birthweight of <1500 g, while one study included infants with birthweight between 750 g and 2000 g. The trials were unmasked but were otherwise of good methodological quality.

	with monitoring (MD 3.2 higher; 4.45 lower to 10.85 higher) [Critical]. **No faltering growth/body composition:** RCT: Increased time to regain birthweight for routine monitoring of gastric residual (MD 1.7 days, 0.01 higher to 3.39 higher) [Critical]. **Quality and volume of gastric aspirate compared with quality alone** **Mortality: RCT:** Little or no effect for using quality and volume of gastric aspirate compared with quality alone may result in little or no difference in all-cause mortality before hospital discharge (Unable to calculate absolute effect due to low or no events) [Critical]. **Necrotising enterocolitis:** RCT: Little or no difference in the incidence of NEC between quality and volume of gastric aspirate compared with quality alone (Unable to calculate absolute effect due to low or no events) [Critical]. **Undesirable effects for Māori** No additional evidence available	Abiramalatha 2023b **Quality and volume of gastric residual compared to quality of gastric residual alone for feed interruption in preterm infants** One trial with 87 preterm infants met the inclusion criteria for this comparison. The trial included infants with 1,500 g to 2,000 g birthweight.

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	Re-feeding gastric residual compared with discarding - Very low certainty evidence overall Quality and volume of gastric aspirate compared with quality alone - Very low certainty evidence overall Routine monitoring compared with no monitoring - Moderate to very low certainty evidence overall	Further RCTs are warranted to assess the effect on long-term growth and neurodevelopmental outcomes.

Outcomes	Importance	Certainty of the evidence (GRADE)
Mortality: RCT: assessed with: All-cause mortality before hospital discharge: Refeed/discard	CRITICAL	⨁◯◯◯ Very low[a,b]
Mortality: RCT assessed with: All-cause mortality before discharge: Quality + Volume/quality	CRITICAL	⨁◯◯◯ Very low[a,c]
Mortality: RCT assessed with: All-cause mortality before discharge: Monitor/not monitor	CRITICAL	⨁◯◯◯ Very low[b,d]
Necrotising enterocolitis: RCT assessed with: Refeed/discard	CRITICAL	⨁◯◯◯ Very low[a,b]
Necrotising enterocolitis: RCT	CRITICAL	⨁◯◯◯

assessed with: Quality + Volume/quality		Very low[a,e]
Necrotising enterocolitis: RCT assessed with: Monitor/not monitor	CRITICAL	⨁◯◯◯ Very low[d,e]
Time to full enteral feeds: RCT assessed with: Time to establish full enteral feeds (120 mL/kg/day) Days: Refeed/discard	CRITICAL	⨁◯◯◯ Very low[a,b]
Time to full enteral feeds: RCT assessed with: Days; monitoring/no monitoring	CRITICAL	⨁⨁⨁◯ Moderate[d]
Duration of initial hospital stay: RCT assessed with: Days: Refeed/discard	CRITICAL	⨁◯◯◯ Very low[a,c]
Fully breastfed or breastmilk feeding at hospital discharge - not measured	CRITICAL	-
Faltering growth/body composition: RCT: Refeed/discard assessed with: Time to regain birthweight (days)	CRITICAL	⨁◯◯◯ Very low[a,c]
Faltering growth/body composition assessed with: Time to regain birthweight (days); monitoring/no monitoring	CRITICAL	⨁◯◯◯ Very low[a,d]
Faltering growth/body composition assessed with: Time to regain birthweight (days); Quality + Volume/quality	CRITICAL	⨁◯◯◯ Very low[a,b]
Sepsis: proven or suspected - not measured	CRITICAL	-
Adverse effects - not measured	CRITICAL	-
Neurodevelopmental impairment - not measured	IMPORTANT	-
Bronchopulmonary dysplasia - not measured	IMPORTANT	-
Retinopathy of prematurity - not measured	IMPORTANT	-
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	-

a. Downgraded one level as evidence is based on a single trial
b. Downgraded one level for imprecision with confidence intervals crossing the line of no effect
c. Downgraded two levels for extremely wide confidence intervals that cross the line of no effect
d. Downgraded one level for concerns for risk of bias
e. Downgraded two levels for imprecision due to extremely wide confidence intervals that cross the line of no effect; downgraded one level for imprecision due to very low/no event rates

Certainty of evidence for Māori

No additional evidence available

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 evidence available	

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	**Re-feeding gastric residual compared with discarding - Very low certainty evidence** Uncertain effect for all-cause mortality before hospital discharge, faltering growth/body composition (time to regain birthweight), NEC, time to full enteral feeds, duration of initial hospital stay **Quality and volume of gastric aspirate compared with quality alone - Very low certainty evidence** Uncertain effect for all-cause mortality before hospital discharge, necrotising enterocolitis, time to full enteral feeds, faltering growth/body composition (regain birthweight) **Routine monitoring compared with no monitoring - Moderate certainty evidence** Increases time to establish full enteral feeds **Routine monitoring compared with no monitoring - Very low certainty evidence** Uncertain effect for all-cause mortality before hospital discharge, necrotising enterocolitis, duration of initial hospital stay Increases time to regain birthweight **Benefits of effects for Māori** No additional evidence available	

Resources required

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS

○ Large costs ○ Moderate costs ● Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ○ Don't know	Minimal extra resources are required to measure aspirates. **Resources required for Māori** No additional evidence available	

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	A formal assessment of the certainty of evidence of the cost was not undertaken. **Certainty of the evidence of resource requirements for Māori** No additional 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 ○ Does not favour either the intervention or the comparison ○ Probably favours the intervention ○ Favours the intervention ○ Varies ● No included studies	There are no studies that assess the specific cost-effectiveness of gastric aspiration compared with no gastric aspiration, particularly in the context of preterm infants. **Cost-effectiveness for Māori** No additional evidence available	

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** Preterm pēpi Māori may be impacted by systemic inequities in how feeding practices like gastric aspiration are applied. While there is limited ethnicity-specific data on gastric aspiration, broader evidence shows pēpi Māori often receive less consistent, evidence-based neonatal care. If clinical decisions around aspiration are influenced by variable protocols, clinician bias, or inconsistent communication with whānau, pēpi Māori may experience delayed feed progression or unnecessarily increased discomfort. Moreover, a lack of culturally safe communication may limit parental involvement in decisions about feeding procedures, contributing to inequitable care experiences and outcomes for whānau Māori in neonatal settings. **Equity for Pacific families** Pacific and other ethnic minority families may face similar inequities in the use of gastric aspiration before feeds for preterm infants. Differences in hospital protocols, coupled with language barriers and limited culturally tailored communication, may reduce family understanding or participation in decisions around feeding practices. Pacific infants, who are also more likely to be born preterm, may be exposed to unnecessary or inconsistent interventions if equity is not actively addressed. Refugee and migrant families may face additional barriers due to unfamiliarity with hospital systems. **Equity for underrepresented groups** Routine procedures like gastric aspirates may not be explained to families with language or health literacy barriers. Underrepresented groups may be less likely to question unfamiliar practices. Equity demands clear, compassionate communication and consistent protocols that ensure all families understand and feel confident in the care their baby receives.	

Acceptability

Is the intervention acceptable to key interest-holders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ● Probably yes ○ Yes ○ Varies	Current monitoring practice in Aotearoa New Zealand varies with some units only checking quality and some checking quality and volume. There may be reluctance to stop monitoring. **Acceptability for Māori**	

○ Don't know	No additional evidence available	

Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know	A change in monitoring practice is probably feasible with clear guidance.	

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			
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	Very low	Low	**Moderate**	High			No included studies

	JUDGEMENT						
REQUIRED RESOURCES							
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. Abiramalatha, T.; Thanigainathan, S.; Ramaswamy, V.V.; Rajaiah, B.; Ramakrishnan, S. Re-feeding versus discarding gastric residuals to improve growth in preterm infants. *Cochrane Database Syst. Rev.* **2023**, *6*, Cd012940, doi:10.1002/14651858.CD012940.pub3.
2. Abiramalatha, T.; Thanigainathan, S.; Ramaswamy, V.V.; Rajaiah, B.; Ramakrishnan, S. Routine monitoring of gastric residual for prevention of necrotising enterocolitis in preterm infants. *Cochrane Database Syst. Rev.* **2023**, *6*, Cd012937, doi:10.1002/14651858.CD012937.pub3.

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