

Vitamin provision in parenteral nutrition for paediatric inpatients in Australia and New Zealand



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Disclosures

No personal disclosures relevant to this project

Previous Takeda advisory group member, educational speaker

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Background



- Children with type 1 or 2 intestinal failure may require inpatient PN (e.g. children with critical illness, cancer, post-surgery or prematurity).
- Vitamins are essential for metabolic function and growth in childhood and, a key component for children receiving PN.
- Children admitted to hospital frequently have risk factors for vitamin deficiencies and toxicity.
- Current parenteral vitamin formulations used in children are mostly based on adult preparations.

Previous AuSPEN project developed evidence-based recommendations for trace element provision in paediatric PN in Australia and New Zealand



Subsequent implementation of new TE formulation in most Australian centres, which has standardised national care.

- No such resources or recommendations currently exist for parenteral vitamins.

Aim:

To review **current practices related to vitamin provision in children receiving PN in Australia and New Zealand (ANZ)** to inform future development of consensus recommendations for optimal vitamin management in children.

(Inpatient and Home PN)

Methods

Study team

- AuSPEN paediatric committee EOI
- 'Vitamins in PN' working group
- Representative group of clinicians actively engaged with managing paediatric PN
- Variety of centres and disciplines

Study population

- Tertiary paediatric centres routinely providing PN to children >1 month to 18 years old, in ANZ
- Preterm infants and neonates excluded
- Nominated representative(s) at each centre identified

Structured survey

- April to May 2025
- Microsoft forms
- 35 questions [peer reviewed]:
 - vitamin dosing
 - administration mode
 - monitoring and shortages

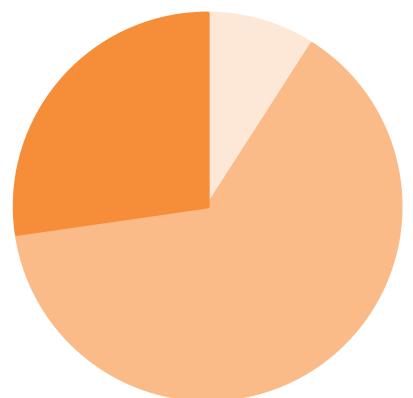
Analysis

- Data de-identified for analysis
- Descriptive statistics for demographic and clinical categorical variables
- Thematic analysis for data from open-ended questions
- Institutional ethics approval RCH, Melbourne

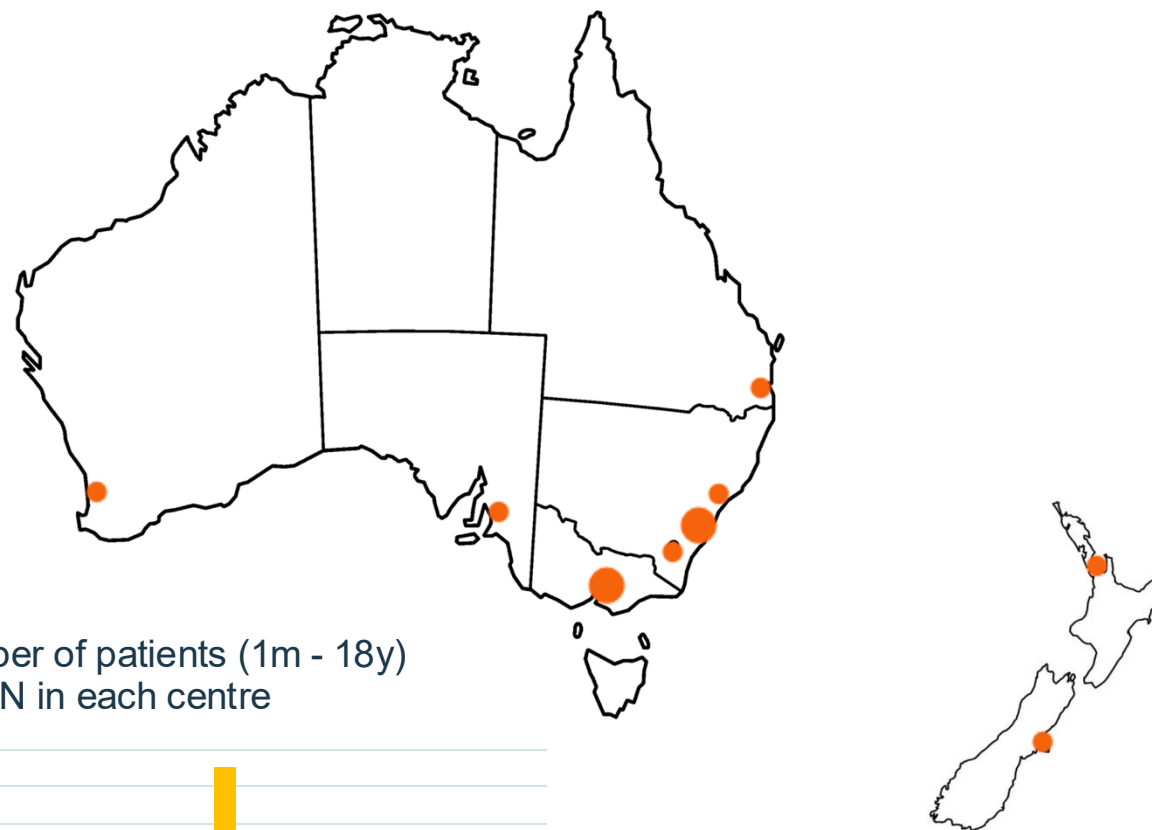
Results

Results

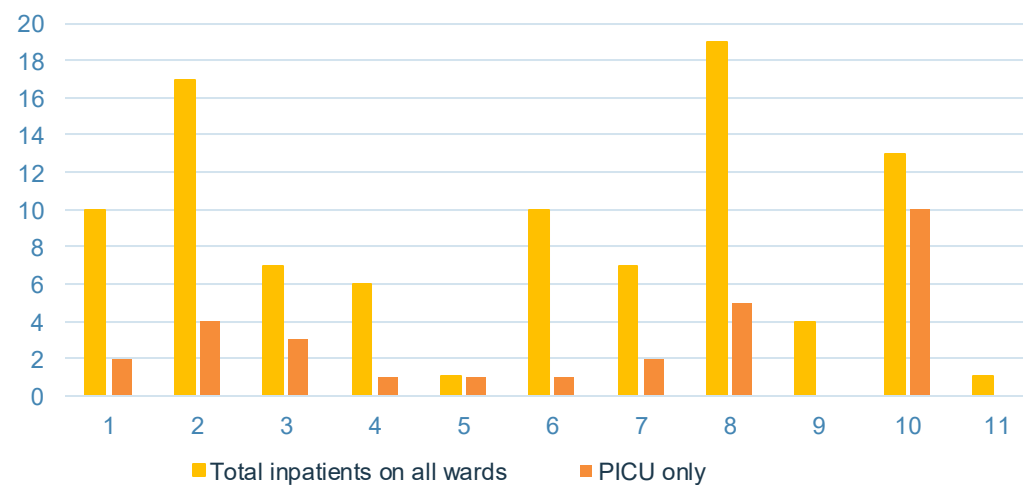
Respondents by discipline (n=11)



Medical Dietitian Pharmacist



Average daily number of patients (1m - 18y) receiving PN in each centre



Median daily number of inpatients receiving PN = 7 (range 1-19)

Vitamin dosing and administration

- Most centres (9/11) follow recommendations from an international nutrition society to guide the administration of vitamins in PN.
- 11/11 centres protect PN bags containing vitamins from light, by using aluminum or another technique.
- Inpatient PN **manufacturing site** varied.
- Vitamin administration:
frequency (predominantly daily)
process of addition to PN varied

Inpatient PN Total = 11 n(%)	
Frequency of administration of water-soluble vitamins	
Daily	10
5 days per week (not on weekends)	1
Frequency of administration of fat-soluble vitamins A, D and E	
Daily	10
6 days per week	-
5 days per week (not on weekends)	1
Frequency of administration of vitamin K	
Daily	5
5 days per week	1
Once per week	1
No supplementation unless clinically indicated	4
No response	
Vitamins are added to:	
Glucose and protein mixture	4
Lipid emulsion	3
Either one	3
WSV are added to glucose/protein mixtures, and FSV to lipid emulsions	1
PN manufacturing location	
On site at the hospital	2
By an external provider	6
Both	3

Vitamin dosing and administration

		Inpatient PN	Manufacturers' dosing recommendations
	Number of respondents	N = 11	
Cernevit®	Prescribing institutions, n	9/11	>11 years: 5 ml/day
	Dosing according to manufacturers' instructions, n	2/9	
Vitalipid N infant® and Vitalipid N adult®	Prescribing institutions, n	7/11	Vitalipid N infant® 1 ml/kg/day, max 10 ml/day
	Dosing according to manufacturers' instructions, n	1/7	Vitalipid N adult® >11 years: 10 ml/day
Soluvit N®	Prescribing institutions, n	7/11	1 ml/kg/day max 10 ml
	Dosing according to manufacturers' instructions, n	5/7	
Multi-vitamin infusion 12®	Prescribing institutions, n	1/11	>11 years: 10 ml/day
	Dosing according to manufacturers' instructions, n	0/1	

- Cernevit® most commonly used formulation.
- Dosing commonly varied from manufacturers' recommendations.
- **Shortages of multivitamin products** for inpatients on PN were reported:
occasionally (9/11)
never (2/11)
- Approaches to shortages varied:
use of alternative (adult) products
stockpiling
prioritising children on HPN

Vitamin monitoring

- All centres monitor vitamin levels in patients receiving long-term inpatient PN
However, classification of 'long-term PN' varies [4 weeks (n=6) to 3 months (n=2)]
- 4/11 centres report additional monitoring in certain high-risk patients, regardless of duration
- 8/11 centres routinely check CRP with micronutrient levels
- Main vitamins routinely monitored: vitamin A, D, E for FSV, and vitamin C, B12, and folate for WSV
- Observed trends include:
 - ↑ vitamin E levels (5/11), ↑ vitamin B12 and folate levels,
 - ↓ vitamin D levels (10/11)
 - ↓ vitamin C levels (2/11)

Strengths

- First comprehensive survey of paediatric parenteral vitamin use in Asia Pacific region
- 100% response rate
- Broad assessment of patterns of vitamin use
- Inpatient (and home PN) setting

Limitations

- Exclusion of preterm infants and neonatal population
- Single response per centre
- Small number of centres

Conclusion

- This transnational survey highlights **variability in current practices related to vitamin provision**, particularly type and dosage of multivitamin product used.
- All sites routinely monitor vitamin levels in inpatients receiving long-term PN however **classification of 'long-term' varies between sites**.
- Most ANZ paediatric centres have **occasionally experienced shortages in multivitamin products**.

Next steps...

These findings will be instrumental to planned development of evidence-based AuSPEN consensus recommendations for vitamin use in paediatric PN in ANZ.

Thanks

Dr Boutaina Zemrani

Members of the AuSPEN 'Vitamins in PN' working group:

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