

The Starving Patient: NG Tube Verification in Austere Medicine

Background

Prolonged casualty care is no longer exclusively the job of secondary and tertiary care centres, and pre-hospital clinicians must embrace that reality or our patients will suffer the consequences. Human beings continue to push themselves further, through physical exploits, scientific research, and humanitarian missions, they remove themselves further from hospitals and definitive care. Whether you be days from a hospital in the Arctic circle, or deep inside the jungle canopy, a critically ill patient still needs nutrition and hydration. You will not have X-ray in these environments but you may have pH strips and POCUS.

Methods

Study Type: Narrative Review

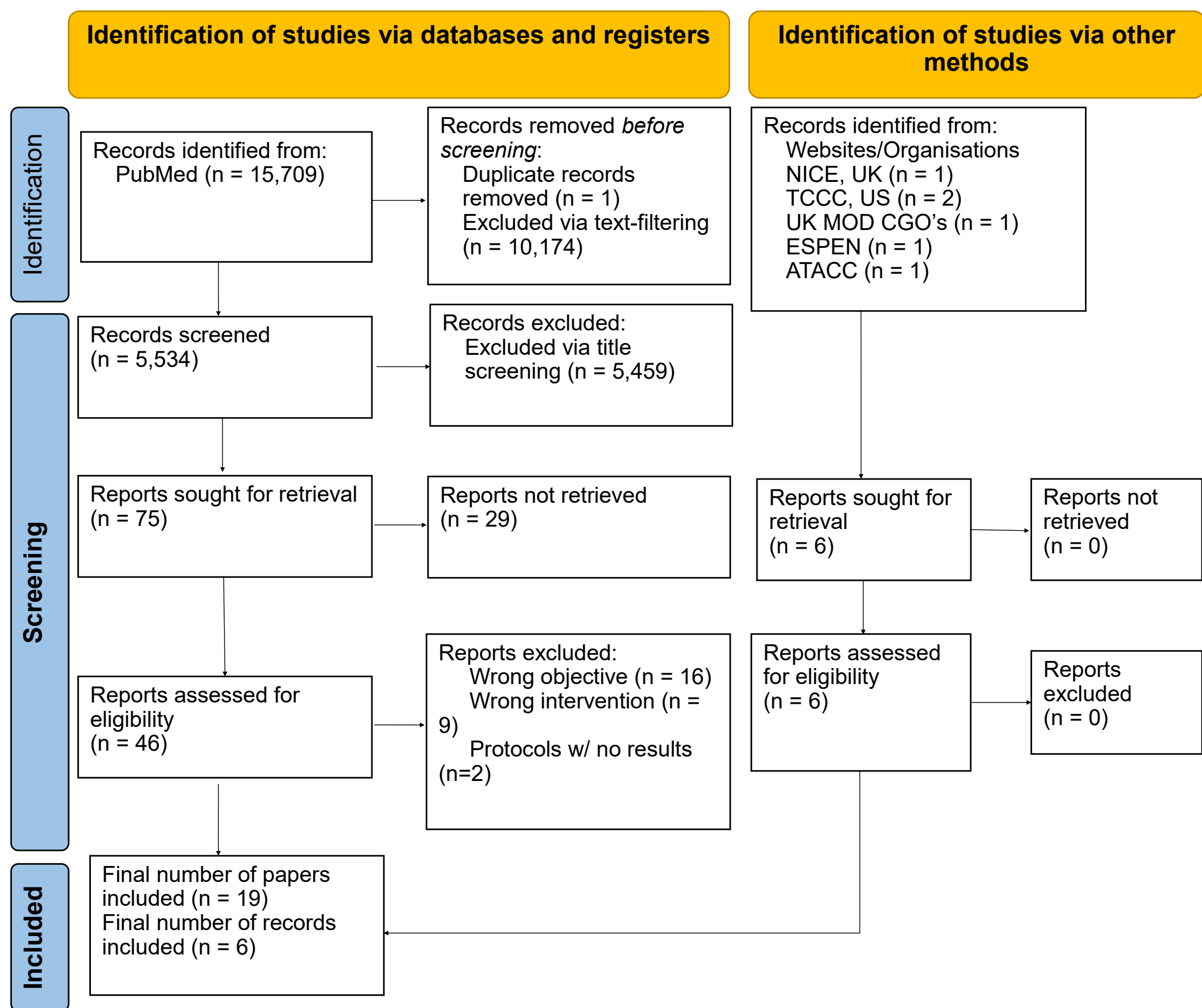
Search Strategy: A comprehensive search of PubMed was conducted of research published in the preceding 20 years (2006—2026). Medical Subject Headings (MeSH) and Boolean strings were utilised to ensure that any research of potential value would be retrieved.

Inclusion Criteria:

- Studies assessing pH and POCUS verification modalities.
- Studies evaluating frameworks, training and use of these modalities.

Exclusion Criteria:

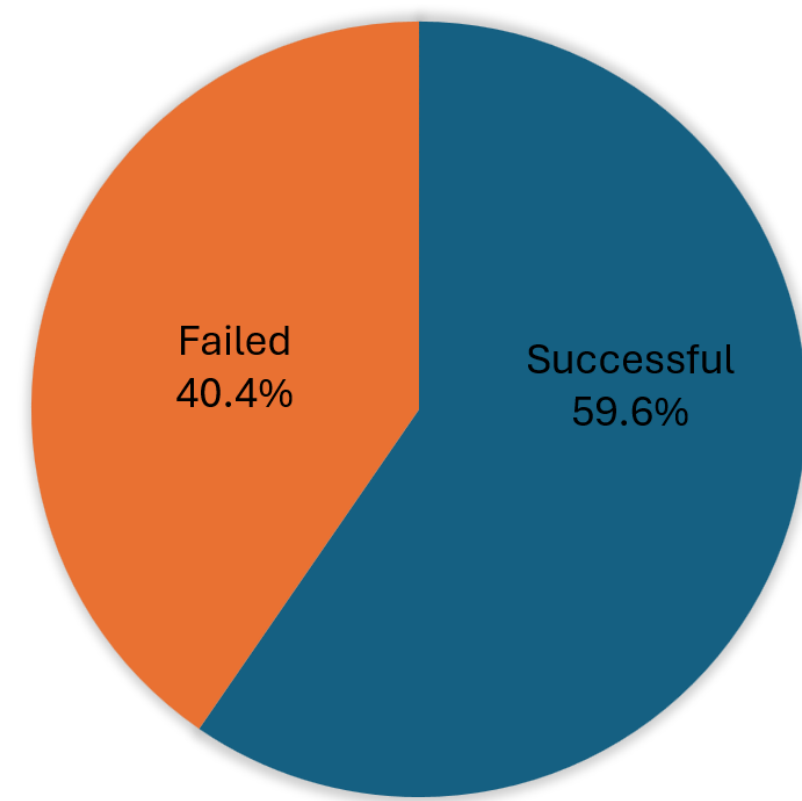
- Studies exclusively based around paediatric or machine ventilated patients.
- Animal studies.



Results

A dual-modality framework is required to maximise patient safety, as retrieving gastric aspirate is unreliable in critically unwell patients.

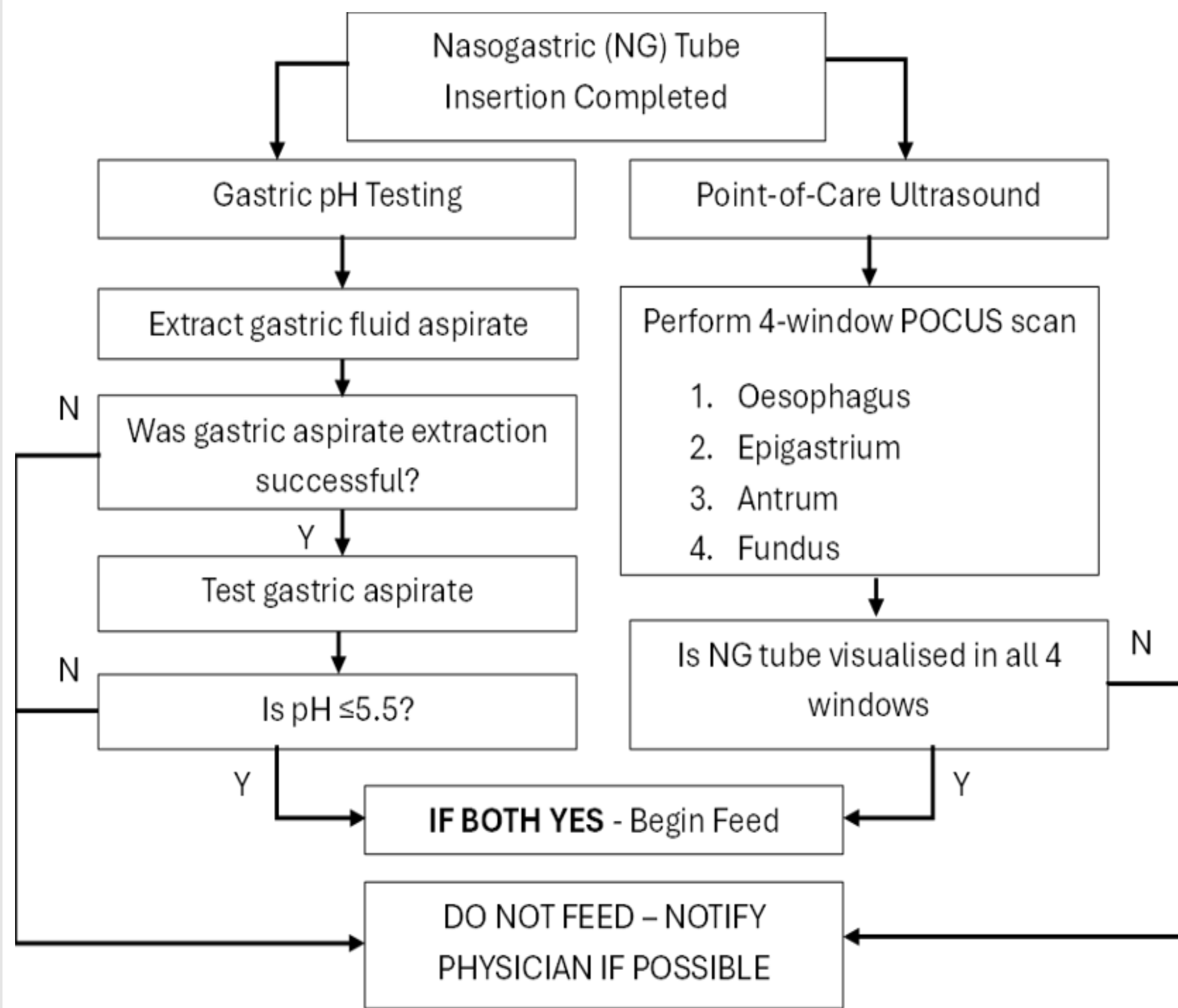
SUCCESS RATE - RETRIEVING GASTRIC ASPIRATE^{1,2}



POCUS Accuracy: Independent POCUS reaches a combined 100% sensitivity³ and 91% specificity⁴.

Biochemical Accuracy: Independent gastric pH testing reaches a mean 84.76% sensitivity and 100% specificity^{1,5}.

Combined Accuracy: Using joint probability logic requiring both modalities to confirm correct positioning of the NG tube gives a joint sensitivity and specificity respectively of 84.76% and 100% - mathematically eliminating false positives.



Limitations

- Database Constraints:** Study had no institutional financing; access was restricted by journal paywalls.
- Search Limitations:** Relevant literature may be indexed in alternative databases such as CINAHL or Scopus.
- Setting:** The majority of data synthesised is from secondary and tertiary care settings rather than remote or austere environments.

Conclusion

This dual-modality framework could provide a clinical handrail for clinicians working in the most remote, austere and resource-denied settings on the planet.

Recommendations

Further targeted research must be conducted to refine this framework:

- Education:** Initial Training and assessment requirements must be studied. Equally, skill-fade and continuation training must be factored into this.
- Logistics:** Research and trialling of appropriate kit, storage, and durability in real-world extremes, such as desert, jungle and arctic environments.
- Clinical Validation:** Primary clinical validation of dual-modality framework compared to standard radiography.

References

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- Borsci, S. et al. (2017) ‘Usability study of pH strips for nasogastric tube placement’, *PLoS ONE*, 12(11), e0189013.
- Zatelli, M. and Vezzali, N. (2016) ‘4-Point ultrasonography to confirm the correct position of the nasogastric tube in 114 critically ill patients’, *Journal of Ultrasound*, 20(1), pp. 53-58.
- Tsujimoto, Y. et al. (2024) ‘Ultrasonography for confirmation of gastric tube placement’, *Cochrane Database of Systematic Reviews*, 7(7), CD0012083.pub3.
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Further references available upon request.

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