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**PECSIG Summer Conference 2025 Abstract**

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2. Title of the abstract:

**Model reporting and sample size employed to develop prediction algorithms for congenital heart disease in children: A systematic review**

3. Introduction:

Congenital heart disease (CHD) affects 1% of births and causes 250,000 deaths globally per year.1 Prediction models can help prioritise investigations and improve outcomes, although models developed from limited samples can increase bias and lead to discrimination. We systematically reviewed the literature to understand sample size and standard of reporting of CHD prediction models.

4. Methods:

We searched Medline for journal articles reporting the development of a prediction model to predict the presence or outcome of CHD in patients under 18 years. Search terms related to artificial intelligence methods, demographic and CHD, combined within groups with ‘OR’, groups combined with ‘AND’. We assessed model reporting against recommended guidance in PROBAST-AI.2

5. Results:

From 446 titles and abstracts screened, 27 eligible articles contained 34 models, 6 employing data from electrocardiogram (ECG), 7 echocardiogram and 21 phonocardiogram. Only 1 (4%) article reported consideration of sample size. Those employing ECG predictors were developed from larger sample sizes (median 12,631 patients, 2038 events), phonocardiogram 184 patients (70 events), echocardiogram 66 patients (34 events). Validation of models was reported in 9 (24%), with only 3 (8%) models reporting an equation or code to allow external validation.

6. Conclusion:

There is a lack of reporting of sample size consideration or final model algorithms that predict CHD in children. Larger samples were employed in models using ECG. Awareness of sample size requirements and transparent reporting of prediction model code for external validation needs to improve to increase the likelihood of application into clinical practice.

7. References:

1) Deng, L., Li, Q., & Cheng, Z. (2025). Evaluating the global, regional, and national burden of congenital heart disease in infants younger than 1 year: a 1990–2021 systematic analysis for the GBD study 2021. *Frontiers in Pediatrics*, 13, 1467914.

2) Moons, K. G., Damen, J. A., Kaul, T., Hooft, L., Navarro, C. A., Dhiman, P., ... & van Smeden, M. (2025). PROBAST+ AI: an updated quality, risk of bias, and applicability assessment tool for prediction models using regression or artificial intelligence methods. *bmj*, 388.