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## Letter to the Editor

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# Age determination concerns in a prevalence study of paediatric cardiac surgery

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To the Editor,

We enjoyed reading Kiskaddon and colleague's (2025)[1] recently published analysis of thromboembolism events in children who underwent cardiac surgery between 2017 and 2024. While the TriNetX network is an excellent tool to conduct high-powered retrospective observational studies,[2] its streamlined analytic capabilities can occasionally result in methodological oversights.[3] An issue of particular importance to paediatric studies is how age filters are used at the cohort design stage. Here, we repeat a small portion of Kiskaddon's and colleagues research design and propose a more accurate method to capture paediatric patient populations.

Kiskaddon and colleagues included patients aged <18 years without reference to which particular timepoint patient age was determined. It is therefore likely that during their design, they chose to filter patients by their current age (i.e. the patient's last known age on the day the data were gathered; Supplementary Table 1). While convenient, this age filtering method has limitations when analysing historical patient data. For example, a 14-year-old who underwent cardiac surgery in 2018 would be suitable for inclusion in this study, however by 2024 when the study was conducted, that patient would already be 20 years of age and would therefore be excluded by the current age filter. This is likely the reason why the study's mean ages at the time of thromboembolism are so low (e.g., 1.4 ± 3.82 years for the arterial thromboembolism group).

A less intuitive but more accurate approach is to filter age based on the patient's age at the time of the event of interest (e.g. cardiac surgery, thromboembolism diagnosis). This process involves manually adding term filters to each of the billing codes used in the cohort design stage (Supplementary table 2), rather than adding a universal current age filter. To demonstrate the improved accuracy of this approach, we compared how these techniques filter the ages of paediatric patients who underwent cardiac surgery between 2017 and 2024 (using Kiskaddon and colleague's list of procedural codes; Table 1). Our findings demonstrate that using a current age filter greatly biases data from earlier years, unnecessarily excluding older paediatric patients. As a result, the mean age of patients included due to a 2023 cardiac surgery is nearly double that of patients included due to a 2017 cardiac surgery.

This example analysis demonstrates that using a current age filter in TriNetX excludes older patients from earlier years, resulting in a lower sample size and introducing temporal biases into cohorts. Instead, we would encourage users of TriNetX to filter by age at the index event by adding term filters to each relevant billing code in the query builder (Supplementary Table 2). We would also encourage journal editors and reviewers of paediatric-based TriNetX studies to closely examine the wording of how age was defined and filtered to generate patient cohorts. We hope that

**Table 1.** Comparison of two age filtering techniques on the inclusion of paediatric patients who underwent cardiac surgery between 2017 and 2024

| | Filter by Current Age | | | Filter by age at cardiac surgery | | |
|---|---|---|---|---|---|---|
| | Number of patients | Age at cardiac surgery (mean ± standard deviation) | Age range | Number of patients | Age at cardiac surgery (mean ± standard deviation) | Age range |
| 2017 | 1980 | 1.71 ± 2.52 | 0-10 | 2494 | 3.71 ± 5.03 | 0-17 |
| 2018 | 1923 | 1.82 ± 2.67 | 0-11 | 2275 | 3.69 ± 5.07 | 0-17 |
| 2019 | 1877 | 2.13 ± 3.13 | 0-12 | 2186 | 3.87 ± 5.22 | 0-17 |
| 2020 | 1916 | 2.05 ± 3.20 | 0-13 | 2123 | 3.29 ± 4.85 | 0-17 |
| 2021 | 2022 | 2.41 ± 3.69 | 0-14 | 2179 | 3.34 ± 4.89 | 0-17 |
| 2022 | 2008 | 2.59 ± 3.84 | 0-15 | 2149 | 3.45 ± 4.96 | 0-17 |
| 2023 | 2490 | 3.22 ± 4.42 | 0-16 | 2590 | 3.73 ± 5.04 | 0-17 |

these suggestions help ensure that future paediatric retrospective cohort studies capture all relevant paediatric patient data.

**Supplementary material.** The supplementary material for this article can be found at https://doi.org/10.1017/S1047951125109190.

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## References

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