

The prognostic weight of thrombocytopenia for mortality increases with age in critically ill children

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Abstract

Objective To investigate whether the prognostic weight of admission coagulation markers for in-hospital mortality varies with age in critically ill children.

Methods We retrospectively analyzed children admitted to the intensive care unit (ICU) in the Pediatric Intensive Care database, with in-hospital mortality as the primary outcome. Logistic regression was used to examine the interactions between age and six coagulation markers—platelet count, prothrombin time (PT), activated partial thromboplastin time (APTT), international normalized ratio (INR), fibrinogen, and D-dimer—with stepwise adjustment for sex, ICU, admission lactate, vasoactive agent use, and diagnostic category. Sensitivity analyses included adjustment with a modified pediatric Sequential Organ Failure Assessment (pSOFA) score, multiple imputation, exclusion of severe thrombocytopenia, and bootstrapping.

Results A total of 11,508 children were included, with 693 in-hospital deaths (6.0%). Among the six markers, only platelet count had a statistically significant age interaction after adjustment (odds ratio [OR]=0.957 per year, $P=0.004$); the INR interaction was not statistically significant after adjustment ($P=0.88$), and no statistically significant age interaction was detected for PT, APTT, fibrinogen, or D-dimer. D-dimer had the highest observed overall area under the receiver operating characteristic curve (0.70). In age-stratified adjusted analyses, the OR for death per $50 \times 10^9/L$ decrease in platelet count was generally higher in older age groups, ranging from 1.13 in neonates to 1.51 in adolescents, and the interaction remained significant after modified pSOFA adjustment, multiple imputation, and all exclusion analyses. Compared with conventional adult cutoffs, the Pediatric Organ Dysfunction Information Update Mandate criteria classified fewer children as abnormal and generally identified subgroups with higher unadjusted odds of death in this cohort.

Conclusion In this cohort, the association between platelet count at ICU admission and in-hospital mortality varied with age, supporting further evaluation and external validation of age-specific platelet weighting in pediatric coagulopathy scoring systems.

Introduction

Critically ill children frequently develop coagulation dysfunction, which is associated with increased mortality [1]. In adult critical care, standardized coagulation scoring tools have been established: the overt disseminated intravascular coagulation score of the International Society on Thrombosis and Haemostasis converts platelet count, prothrombin time (PT), fibrinogen, and D-dimer into risk categories using fixed cutoffs [2], and the sepsis-induced coagulopathy score follows the same rationale of fixed cutoffs and fixed weights [3]. These scores were all derived and validated in adult populations and thus implicitly incorporate adult reference ranges and prognostic weights; whether they can be appropriately applied directly to children requires careful evaluation [4]. Children are not simply scaled-down adults, as their coagulation system matures progressively with development: Andrew and colleagues first quantitatively characterized developmental hemostasis in full-term infants [5] and subsequently in

preterm infants [6]; this phenomenon has been repeatedly confirmed under modern laboratory conditions [7], and a multicenter study has accordingly established age-specific coagulation reference ranges for the pediatric population [8]. In 2022, the Pediatric Organ Dysfunction Information Update Mandate (PODIUM) further proposed pediatric-specific criteria for coagulation dysfunction (international normalized ratio [INR] > 1.5, platelet count < $100 \times 10^9/L$, and D-dimer > 10 times the upper limit of normal [ULN]) while excluding activated partial thromboplastin time (APTT) [9].

However, this body of work has addressed the question of cutoffs—that is, "what counts as abnormal"—whereas whether the prognostic weight of coagulation markers for mortality changes with age remains unsystematically studied. A previous study based on the same database suggested that elevated D-dimer is associated with poor outcomes in critically ill children, but it did not test the age dependence of prognostic weight [10]. If the prognostic weight of a marker does vary with age, then even when pediatric-specific cutoffs are adopted, retaining adult-style fixed weights could introduce systematic bias. Platelet count warrants particular attention in this regard, as neonatal platelet production and function have distinctive developmental characteristics [11]. Therefore, using the Pediatric Intensive Care (PIC) database [12] with in-hospital mortality as the outcome, we tested the interactions between six routinely measured admission coagulation markers and age, aiming to determine which markers show age-dependent prognostic associations and to inform future evaluation of age-specific weighting in pediatric coagulopathy scores.

1 Subjects and Methods

1.1 Study subjects

Data were obtained from children hospitalized in the neonatal, pediatric, surgical, cardiac, and general intensive care units (ICUs) of the Children's Hospital, Zhejiang University School of Medicine, covering ICU admissions from 2010 to 2018. Only the first ICU admission of each child was included. Patients were divided into six groups according to age at admission: neonates (< 28 days), infants (28 days to < 1 year), toddlers (1 to < 3 years), preschool children (3 to < 6 years), school-age children (6 to < 12 years), and adolescents (12 to 18 years). The data were obtained from the PIC database, version 1.1.0 (PhysioNet, <https://doi.org/10.13026/32x9-wv38>) [12]. Access to the database was granted after the required human-subjects research training and data use agreement had been completed (Collaborative Institutional Training Initiative [CITI] Program certificate Record ID 78362653).

1.2 Variables and outcomes

The first measurements of platelet count, PT, APTT, INR, fibrinogen, and D-dimer obtained within the window from 6 hours before to 24 hours after ICU admission were collected, and physiologically implausible values were excluded. Admission blood lactate, vasoactive agent use, and admission diagnosis were also recorded. The outcome was in-hospital mortality. Because blood product transfusion, mechanical ventilation, and Pediatric Risk of Mortality and Pediatric Index of Mortality

scores were incompletely recorded in this database, they were not included in the adjustment. Adult reference values were taken from published literature and consensus statements.

1.3 Sensitivity analyses

- To verify the reliability of the platelet–age relationship, robustness analyses were performed from multiple perspectives: (1) further adjustment for liver and kidney function; (2) because Glasgow Coma Scale scores and fraction of inspired oxygen data were unavailable, illness severity was instead adjusted for using a modified pediatric Sequential Organ Failure Assessment (pSOFA) score comprising only the hepatic, renal, and circulatory systems [13]; (3) coagulation tests were ordered at the clinician's discretion, and untested children were mostly mild cases, so simply excluding them could introduce bias; we therefore first compared baseline characteristics between tested and untested children, and after confirming that missingness was related to illness severity, missing coagulation measurements were handled by multiple imputation (10 datasets) using available variables such as age, lactate, and diagnostic category; each imputed dataset was analyzed separately, the results were pooled according to Rubin's rules, and the platelet–age relationship was re-examined; (4) the analyses were repeated after excluding children with malignancy, hematologic disease, liver disease, or platelet count $< 50 \times 10^9/L$, respectively; (5) the worst platelet value within 24 hours was used instead; and (6) the stability of the results was assessed with 500 bootstrap resamples. In addition, because APTT prolongation in neonates may be confounded by heparin contamination, the analysis was repeated after excluding children who had received heparin within 24 hours before or after admission. Bootstrap results are reported as the original estimate, the bootstrap bias, the bootstrap standard error, and the percentile 95% confidence interval (CI).

1.4 Statistical analysis

Continuous variables are expressed as medians (interquartile ranges). The ability of each coagulation marker to predict in-hospital mortality was evaluated by the area under the receiver operating characteristic curve (AUC). Logistic regression was used to examine the interactions between coagulation markers and age, with stepwise adjustment for sex, ICU, lactate, vasoactive agent use, and diagnostic category. Statistical analyses were performed using Python 3.9 (pandas, NumPy, statsmodels 0.14, scikit-learn 1.6, SciPy, and patsy); logistic regression and interaction testing, multiple imputation by chained equations (MICE), inverse probability weighting, and bootstrapping were implemented with statsmodels, and AUCs were computed with scikit-learn. A two-sided $P < 0.05$ was considered statistically significant. In this study, prognostic weight was operationalized as the marker×age interaction term in logistic regression, whereas discrimination was assessed separately by the AUC; the two quantities are reported distinctly throughout. Because six markers were each tested for an age interaction, multiplicity was addressed using the Bonferroni-corrected threshold ($0.05/6 = 0.0083$) and the Benjamini-Hochberg false discovery rate.

2 Results

2.1 Cohort characteristics

A total of 12,839 children with valid age records were identified among first ICU admissions, of whom 11,508 (89.6%) had at least one coagulation test after admission and constituted the analysis cohort; the testing rate for platelet count reached 99%. There were 693 in-hospital deaths in the entire cohort (6.0%), with the highest mortality among neonates (8.6%). Males accounted for 57% of the cohort, and the median age was 0.7 years (interquartile range, 0.1–3.4 years). Compared with survivors, children who died had lower admission platelet counts and fibrinogen levels and higher PT, APTT, INR, and D-dimer values (Table 1).

Table 1
Cohort characteristics

Characteristic	Overall (n = 11,508)	Survivors (n = 10,815)	Non-survivors (n = 693)
Age, years	0.7 (0.1 ~ 3.4)	0.7 (0.1 ~ 3.5)	0.4 (0.0 ~ 2.2)
Male, n (%)	6,591 (57)	6,155 (57)	436 (63)
Platelet count, $\times 10^9/L$	262 (177 ~ 350)	264 (180 ~ 351)	206 (106 ~ 313)
PT, s	13.0 (11.9 ~ 15.0)	13.0 (11.9 ~ 14.8)	15.2 (12.8 ~ 20.9)
APTT, s	33.9 (28.2 ~ 45.5)	33.6 (28.1 ~ 44.3)	46.6 (32.4 ~ 71.5)
INR	1.08 (0.99 ~ 1.25)	1.08 (0.99 ~ 1.24)	1.27 (1.07 ~ 1.75)
Fibrinogen, g/L	2.09 (1.55 ~ 2.77)	2.10 (1.58 ~ 2.78)	1.63 (0.97 ~ 2.41)
D-dimer, mg/L	1.21 (0.63 ~ 2.39)	1.19 (0.62 ~ 2.29)	3.40 (1.14 ~ 6.53)
<i>Note: Data are presented as median (interquartile range) unless otherwise indicated. PT, prothrombin time; APTT, activated partial thromboplastin time; INR, international normalized ratio.</i>			

2.2 Distribution of coagulation markers across age groups

Admission coagulation markers in critically ill children varied systematically with age: APTT, PT, and INR in neonates were markedly higher than the adult reference ranges and gradually approached adult levels after 1–3 years of age; fibrinogen increased with age; and D-dimer was highest in neonates. Although the absolute levels of these markers were shifted by the presence of critical illness, the directions of their age-related changes were consistent with the characteristics of developmental hemostasis (Fig. 1). To examine whether APTT prolongation in neonates was caused by heparin contamination from indwelling catheters, a sensitivity analysis was performed, which showed that only 9% of neonates had orders for parenteral heparin within 24 hours before or after ICU admission. After these children were excluded, the APTT distribution did not change materially (median, 61.5 s vs. 62.2 s; proportion exceeding 40 s, 89% vs. 91%), suggesting that recorded heparin exposure was unlikely to fully explain the observed APTT prolongation.

Note

The gray band indicates the published adult reference ranges. PT, prothrombin time; APTT, activated partial thromboplastin time; INR, international normalized ratio.

2.3 Predictive performance of each marker for mortality and its interaction with age

Among the six markers, only platelet count showed statistically significant evidence of an age interaction after multivariable adjustment (Table 2, Fig. 2). The AUC for platelet count was 0.56 in infants and 0.78 in adolescents. The platelet×age interaction was statistically significant in the unadjusted analysis and remained significant after adjustment in multiple models (odds ratio [OR] = 0.957 per year, $P = 0.004$). In contrast, the INR interaction was not statistically significant after adjustment ($P = 0.88$), and no statistically significant age interaction was detected for PT, APTT, or fibrinogen. D-dimer had the highest observed overall AUC (0.70), and no statistically significant D-dimer×age interaction was detected.

When platelet count, APTT, and INR were simultaneously entered into a multivariable logistic model (adjusted for age, sex, and ICU; PT was not entered because of mathematical collinearity with INR, and fibrinogen and D-dimer were not entered because of substantial missing data), all three remained independently associated with in-hospital mortality ($N = 8,481$): each standard-deviation increase in APTT (OR 1.30, 95% CI 1.19–1.41) and in INR (OR 1.14, 95% CI 1.06–1.22) was associated with a higher risk of death, whereas each standard-deviation increase in platelet count (OR 0.76, 95% CI 0.68–0.84) was associated with a lower risk of death. The platelet×age interaction remained significant after correction for multiple testing (Bonferroni threshold 0.0083; Benjamini-Hochberg $q = 0.022$).

Table 2
Mortality prediction and age interaction of admission coagulation markers

Marker	Overall AUC	Neonatal AUC	Adolescent AUC	Unadjusted interaction P value	Adjusted interaction OR per year (P value)
Platelet count	0.61	0.62	0.78	9.9×10^{-6}	0.957 (0.004)
INR	0.69	0.62	0.74	4.1×10^{-4}	0.999 (0.88)
PT	0.69	0.62	0.74	0.57	1.010 (0.28)
APTT	0.67	0.61	0.64	0.13	0.989 (0.36)
Fibrinogen	0.64	0.65	0.62	0.14	1.005 (0.76)
D-dimer	0.7	0.72	0.69	0.62	1.013 (0.28)

Note: Adjusted interactions are the per-year interaction ORs and P values after adjustment for sex, ICU, lactate, vasoactive agent use, and diagnosis. Interaction ORs are expressed per 1-standard-deviation higher platelet count (standard deviation = $144.8 \times 10^9/\text{L}$); an OR < 1 therefore indicates that the protective association of a higher platelet count becomes stronger with age, which is equivalent to a strengthening harmful association of thrombocytopenia and is directionally consistent with the age-stratified ORs per $50 \times 10^9/\text{L}$ decrease presented in Fig. 3. AUC, area under the receiver operating characteristic curve; OR, odds ratio; ICU, intensive care unit; INR, international normalized ratio; PT, prothrombin time; APTT, activated partial thromboplastin time.

2.4 Robustness of the platelet×age interaction

The platelet–age interaction was generally consistent across the sensitivity analyses. Models adjusted for sex, lactate, and vasoactive agent use were fitted separately within each of the six age strata, and the adjusted OR for in-hospital death per $50 \times 10^9/\text{L}$ decrease in platelet count was generally higher in older age groups (Fig. 3). The adjusted OR was 1.13 (95% CI 1.05–1.21) in neonates and 1.51 (95% CI 1.16–1.97) in adolescents. In the reported model-based estimates, a decrease in platelet count from 250 to $50 \times 10^9/\text{L}$ corresponded to risk increases of approximately 1.7 percentage points in neonates and 4.8 percentage points in adolescents; these absolute estimates depend on the covariate profile and age-specific baseline mortality. The interaction remained significant after further adjustment for liver and kidney function, the modified pSOFA score, or the count of organ dysfunctions; after excluding children with malignancy/hematologic disease, liver disease, or severe thrombocytopenia; and after using the worst platelet value within 24 hours. Bootstrap results were directionally consistent, and the nonlinearity test did not provide evidence against the linear specification (Table 3). After children with sepsis were excluded, the interaction estimate remained similar (OR per year = 0.959, P = 0.007), and the platelet×age×sepsis three-way interaction was not statistically significant (P = 0.65). Platelet distributions were broadly comparable across age groups (standard deviation $114\text{--}168 \times 10^9/\text{L}$; proportion below $100 \times 10^9/\text{L}$, 8.9%–14.4%), suggesting that differences in platelet-value ranges were unlikely to fully explain the age gradient.

Fibrinogen and D-dimer were tested at the clinician's discretion, and tested children were more severely ill and older (propensity model C-statistic = 0.833). Multiple imputation was therefore performed under a missing-at-random assumption conditional on the included variables. The post-imputation estimates were directionally consistent with the complete-case results (Table 3). Platelet count was measured in 99% of the cohort, limiting the impact of missing platelet data on the primary analysis.

Table 3
Robustness analyses of the platelet×age interaction

Analysis	Interaction OR per year	P value	N included
Baseline (sex + ICU + lactate + vasoactive agents)	0.959	0.005	11,330
Renal (creatinine + urea) + hepatic (bilirubin)	0.961	0.021	8,190
Modified pSOFA adjustment	0.968	0.023	11,419
Non-coagulation organ dysfunction count (0–4) adjustment	0.966	0.017	11,419
Excluding malignancy/hematologic disease	0.954	0.009	10,921
Excluding malignancy + liver disease	0.955	0.011	10,870
Excluding severe thrombocytopenia (< 50)	0.94	0.002	10,720
Excluding patients with sepsis	0.959	0.007	11,080
Worst platelet value within 24 h used instead	0.961	0.007	11,337
Multiple imputation (MICE, 10 imputations, full sample)	0.958 [0.931–0.986]	0.003	11,508
Bootstrap (500 resamples)	β – 0.042 (bias – 0.001; standard error 0.015)	Percentile 95% CI – 0.073 to – 0.015	—
Age spline (nonlinearity test)	—	Interaction P = 0.145; linearity adequate	—
<i>Note: The number of patients included refers to the children actually entering the model in each analysis. In the adjustment analyses, children with missing data on the newly added variables were excluded (complete-case analysis); in the exclusion analyses, children meeting the respective exclusion criteria were removed. Each row represents a separate sensitivity analysis performed on the baseline model, and the rows are not additive. OR, odds ratio; CI, confidence interval; ICU, intensive care unit; pSOFA, pediatric Sequential Organ Failure Assessment; MICE, multiple imputation by chained equations.</i>			

2.5 Performance of the PODIUM pediatric criteria in this cohort

When applied to this cohort, the PODIUM pediatric criteria identified smaller proportions of children as abnormal and yielded generally higher unadjusted mortality ORs than the selected adult cutoffs (Table 4). The adult D-dimer cutoff (> 0.5 mg/L) classified 36% of patients as abnormal and was associated with an OR of 0.69. Among neonates, the proportion classified as abnormal was 1% with the PODIUM cutoff and 95% with the adult cutoff. Only 3% of the cohort met two or more PODIUM criteria, with an OR for death of 5.06 (95% CI 3.94–6.49).

Table 4
PODIUM versus adult cutoffs: hit rates and mortality ORs

Marker	PODIUM cutoff: hit %, OR (95% CI)	Adult cutoff: hit %, OR
INR	> 1.5: 8%, 4.82 (4.00 ~ 5.82)	> 1.2: 23%, 2.63
Platelet count	< 100: 10%, 3.05 (2.53 ~ 3.68)	< 150: 18%, 2.60
D-dimer	> 10×ULN: 5%, 2.68 (2.07 ~ 3.45)	> 0.5: 36%, 0.69
≥ 2 PODIUM criteria	3%, 5.06 (3.94 ~ 6.49)	—
<i>Note: ULN, upper limit of normal; the ULN for D-dimer was taken as 0.5 mg/L. The PODIUM criteria do not include APTT. In this cohort, APTT values in neonates generally exceeded the adult cutoff, and this remained the case after children exposed to heparin were excluded, consistent with the rationale for excluding APTT from the criteria. PODIUM, Pediatric Organ Dysfunction Information Update Mandate; INR, international normalized ratio; APTT, activated partial thromboplastin time; OR, odds ratio; CI, confidence interval.</i>		

3. Discussion

In this cohort of critically ill children, platelet count was the only marker with a statistically significant adjusted age interaction: the association between lower platelet count and in-hospital mortality was generally stronger in older children, and the direction of the interaction was consistent across the reported sensitivity analyses. The adjusted INR interaction was not statistically significant, and no statistically significant age interaction was detected for PT, APTT, fibrinogen, or D-dimer; D-dimer nevertheless had the highest observed overall AUC. These results support further evaluation of age-specific platelet weighting in pediatric coagulopathy scoring. To our knowledge, this study is among the first to examine whether the mortality association of a routine coagulation marker varies with age in critically ill children, and the findings raise questions about fixed platelet weights across the pediatric age range.

That the reference values of coagulation markers vary with age has long been established: from the quantitative description of developmental hemostasis, to the establishment of age-specific pediatric reference ranges, to the pediatric-specific cutoffs proposed by PODIUM, previous work has all addressed

the cutoff question of "what counts as abnormal." The present study provides evidence that the association between platelet count and mortality may differ by age, a dimension that has received limited systematic investigation. A prior study based on the same database reported the prognostic value of D-dimer [10]; our D-dimer findings were consistent with that report, and no statistically significant D-dimer×age interaction was detected.

Age-related differences in platelet biology and in the causes of thrombocytopenia could contribute to the observed interaction [11, 14], but these mechanisms were not directly evaluated in this database. The interaction estimates remained in the same direction after excluding children with malignancy, hematologic disease, or liver disease, suggesting that these recorded diagnoses alone did not fully explain the association. An association between thrombocytopenia and mortality has been reported in adult intensive care [15]; our findings suggest that its strength may also vary with age in children. Current pediatric organ dysfunction and coagulation scores generally assign fixed weights to individual markers [16]; our results support evaluating, but do not establish, whether age-specific platelet weighting improves risk prediction. In addition, APTT values in neonates generally exceeded the adult cutoff after children with recorded heparin exposure were excluded, illustrating the limitations of applying adult APTT cutoffs to neonates rather than establishing that APTT should be excluded from pediatric criteria. Residual age-related differences in thrombocytopenia etiology remain possible, and the proposed mechanism requires prospective, etiology-stratified investigation.

These findings may inform future development of pediatric scoring systems. The most recent international criteria continue to assign fixed, age-independent points to coagulation variables: the Phoenix criteria for pediatric sepsis published in 2024 score platelet count together with INR, D-dimer, and fibrinogen using uniform thresholds and weights across the entire pediatric age range [17, 18]. Our results generate a hypothesis for score-development studies rather than a ready-to-implement modification. Although D-dimer had the highest observed overall AUC and no statistically significant D-dimer×age interaction was detected, this does not establish that a fixed D-dimer weight is optimal. The generally stronger platelet–mortality association in older children raises the possibility that a fixed platelet weight could be miscalibrated across age, but score calibration was not assessed here. Age-specific platelet weighting therefore requires model development and external validation before clinical use.

This study has several limitations. First, it is a single-center retrospective study, and external validation in multicenter, prospective datasets is warranted. Second, the database lacks validated pediatric illness-severity scores as well as records of blood product transfusion and mechanical ventilation; although the interaction estimate was generally consistent across adjustments including lactate, vasoactive agent use, and the modified pSOFA score, residual confounding cannot be excluded. Third, the effect size of the platelet×age interaction is moderate; platelet count cannot be used alone as a mortality prediction tool, and the clinical value of age-specific weighting still requires confirmation in prospective studies. Fourth, the modified pSOFA applied here comprised only the hepatic, renal, and cardiovascular components and is therefore a simplified composite rather than the complete pSOFA score. Fifth, the

adolescent stratum contained relatively few events (18 deaths), so the upper end of the age gradient should be interpreted with caution; the interaction test, however, was based on the full cohort with age modelled continuously rather than on any single stratum. Finally, the 2010–2018 data, clinician-directed testing, missing fibrinogen and D-dimer measurements, and the admission sampling window may limit generalizability and introduce bias; this observational analysis neither establishes causality nor validates an age-weighted score.

Declarations

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: the PIC database v1.1.0 is available from PhysioNet under credentialed access at <https://doi.org/10.13026/32x9-wv38> [12]. The de-identified derived dataset and analysis code (Python 3.9; pandas, NumPy, statsmodels, scikit-learn, SciPy, and patsy) are available from the corresponding author upon reasonable request, subject to the PhysioNet Credentialed Health Data Use Agreement.

Ethics statement

The studies involving humans were approved by the Institutional Review Board of the Children's Hospital, Zhejiang University School of Medicine (establishment of the PIC database), with the requirement for individual informed consent waived because all data were de-identified before release. This retrospective secondary analysis of the de-identified public dataset was exempt from ethics review and informed consent in accordance with the local legislation and institutional requirements, as confirmed by the Ethics Committee of Shangrao People's Hospital. The study was conducted in accordance with the Declaration of Helsinki. Database access was granted under the PhysioNet Credentialed Health Data Use Agreement (author QC completed the required CITI Program human-subjects research training, Record ID 78362653), and all analyses complied with its terms.

Author contributions

ZX: Conceptualization, Writing – original draft. LZ: Conceptualization, Supervision, Writing – review & editing. QZ: Conceptualization, Supervision, Writing – review & editing. QC: Data curation, Formal analysis, Investigation. WL: Data curation, Validation. JC: Data curation, Validation. GM: Visualization, Writing – review & editing. XW: Visualization, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Figures

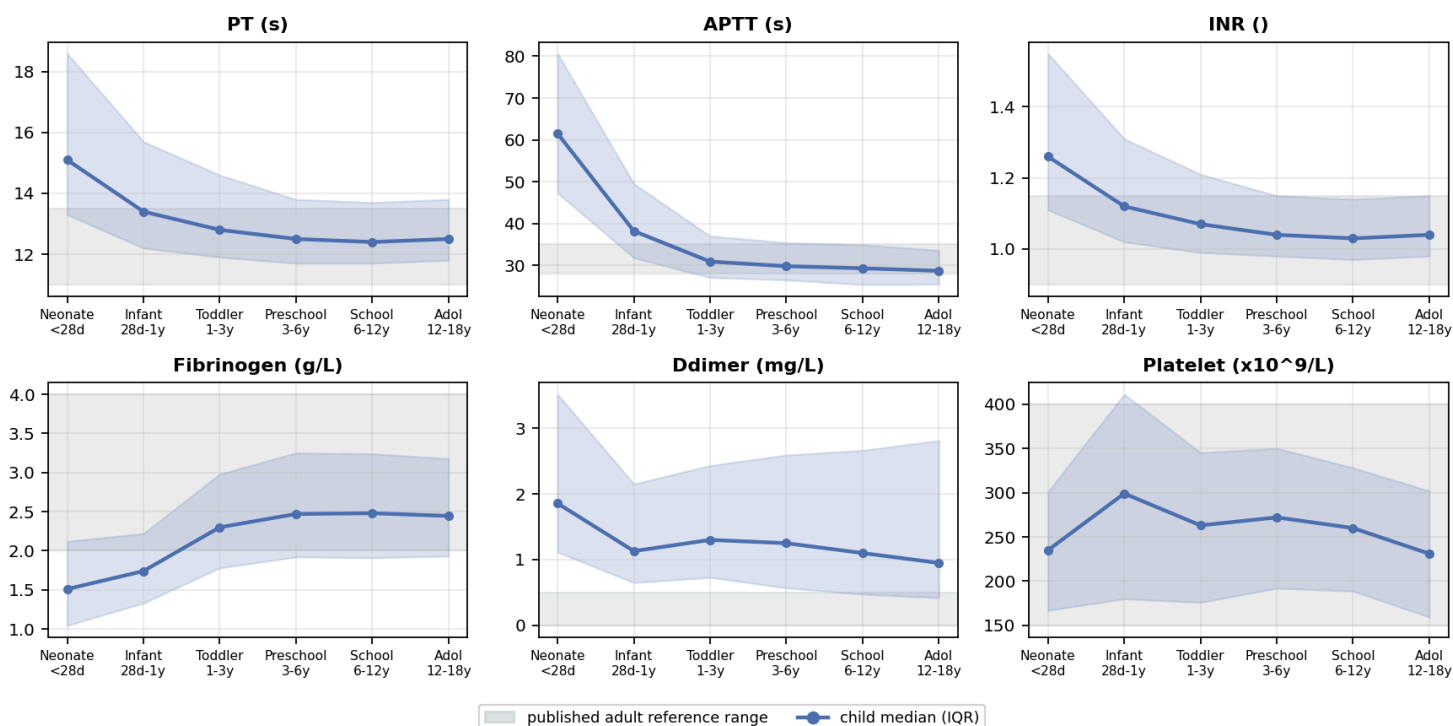


Figure 1

Changes in admission coagulation markers across age groups in critically ill children.

Note: The gray band indicates the published adult reference ranges. PT, prothrombin time; APTT, activated partial thromboplastin time; INR, international normalized ratio.

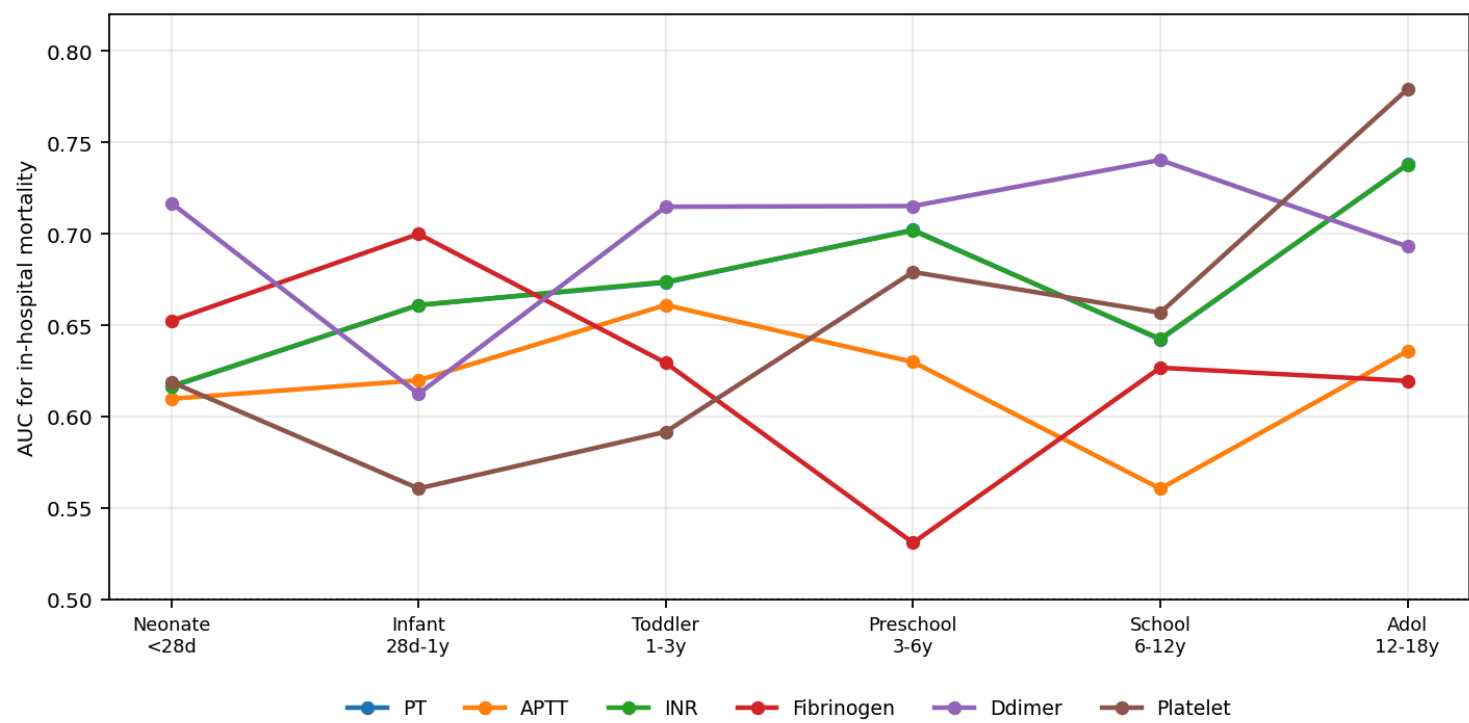


Figure 2

Mortality discrimination (AUC) of admission coagulation markers by age group. AUC, area under the receiver operating characteristic curve; PT, prothrombin time; APTT, activated partial thromboplastin time; INR, international normalized ratio.

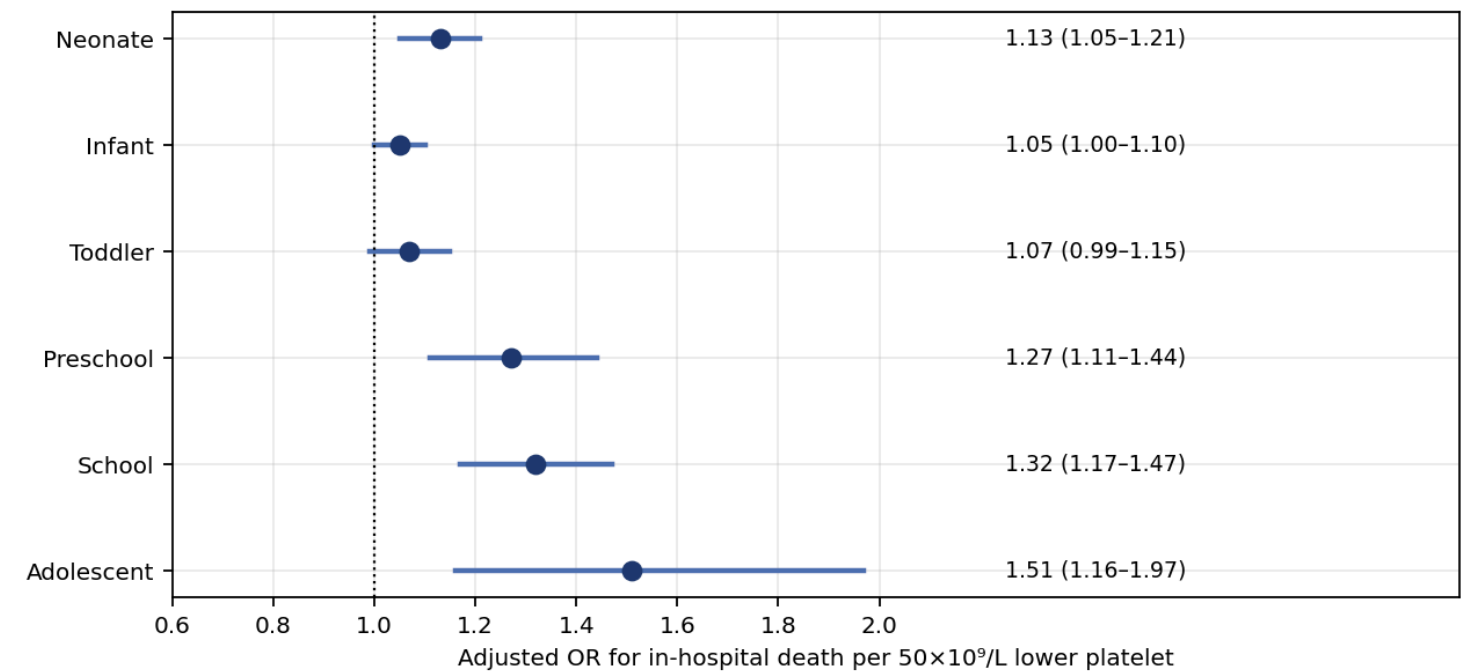


Figure 3

Adjusted OR (95% CI) for in-hospital death per $50 \times 10^9/L$ decrease in platelet count, by age group. OR, odds ratio; CI, confidence interval.