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Pediatric Vascular Access Quality by Device & Setting:
A Multicenter Analysis of the INCATIV Index

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BACKGROUND

Vascular access quality is critical in pediatric and neonatal patients. Yet, few tools provide a comprehensive, quantitative assessment of access quality in real-world settings.

INCATIV INDEX

Composite quality score for vascular access devices

1 — 5 — 10

Higher score = better overall quality

STUDY DESIGN

Multicenter · Observational
Descriptive · Cross-sectional

6	537
HOSPITALS	VADS
9	**8**
DEVICE TYPES	SERVICES

OBJECTIVE

To assess how catheter type and clinical service influence INCATIV Index scores in routine pediatric and neonatal practice.

KEY FINDINGS

+1.116
β FICC vs CVP · p=.045
Best performing central device

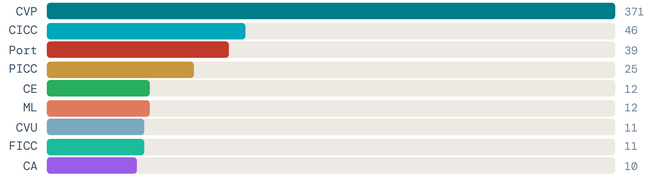
−1.228
β Pediatric Ward vs Intermedios · p=.031
Lowest quality service

χ²=128
Service effect · p<.001
Larger than device effect (χ²=62.2)

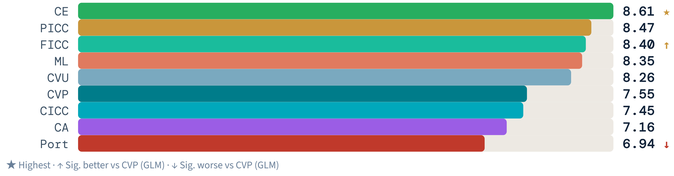
METHODS

- → **Variables:** catheter type, clinical service, age (months), INCATIV Index (1–10)
- → **Kruskal–Wallis test** to compare INCATIV distributions across device types and services
- → **General Linear Model (GLM)** with INCATIV as dependent variable; catheter type & service as factors; age as covariate
- → Results reported as **β, 95% CI, p-value**
- → Reference categories: CVP (catheter); Pediatric Intermediate Care (service)

SAMPLE DISTRIBUTION



INCATIV MEAN BY DEVICE



★ Highest · ↑ Sig. better vs CVP (GLM) · ↓ Sig. worse vs CVP (GLM)

KRUSKAL-WALLIS TEST

BY CATHETER TYPE

$\chi^2(8) = 62.2$
$p < .001$

BY CLINICAL SERVICE

$\chi^2(7) = 128$
$p < .001$

Both catheter type and clinical service showed statistically significant differences in INCATIV distribution. The effect size was notably larger for service (χ^2=128) than for device type alone (χ^2=62.2).

GLM – DEVICE EFFECTS

MODEL FIT $R^2 = 0.325$

FICC VS CVP
+1.116
IC: +0.025 to +2.208
p = .045

PORT VS CVP
−0.828
IC: −1.379 to −0.278
p = .003

COMPARISON VS CVP	B	95% CI	P
Age (covariate)	−0.018	—	.205 ns

After adjusting for service & age · CVP = reference category

GLM – SERVICE EFFECTS

SERVICE	B VS REF	P
Ped. Intermediate Care REF	—	—
Pediatric Ward	−1.228	.031
PICU	—	ns
NICU	—	ns

Catheter × Service interaction: p = .245 (ns overall)

CONTEXTUAL ADVANTAGES – MIDLINE

Although the global catheter × service interaction was **not significant (p = .245)**, Midline showed notable contextual benefits in specific clinical settings:

PED. WARD
+2.239
p = .006
Higher INCATIV vs CVP in pediatric ward setting

PICU
+1.735
p = .043
Higher INCATIV vs CVP in pediatric ICU setting

CONCLUSIONS

1 Device choice matters

FICC outperforms CVP (β=+1.116, p=.045), while Port shows significantly lower quality after adjustment (β=−0.828, p=.003). These findings held after adjusting for clinical service and patient age, confirming that catheter type is an independent determinant of vascular access quality.

2 Service context is key

Pediatric Ward shows lower INCATIV vs Intermediate Care (β=−1.228, p=.031). The service effect (χ^2=128) exceeded device effect (χ^2=62.2), highlighting that clinical environment and nursing protocols are critical drivers of vascular access quality beyond device type alone.

3 Personalized device selection

Contextual Midline advantages in Pediatric Ward (β=+2.239, p=.006) and PICU (β=+1.735, p=.043) support individualized VAD strategies. Device selection should consider both clinical setting and patient needs to maximize vascular access quality outcomes.

+1.116	−0.828	R^2=0.325	χ^2=128	χ^2=62.2	−1.228	+2.239	+1.735	p<.05
B FICC VS CVP	B PORT VS CVP	MODEL FIT	SERVICE EFFECT	DEVICE EFFECT	B PED. WARD	B ML PED. WARD	B ML PICU	BOTH SIGNIFICANT