

Pediatric Cardiac ICU

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WHY...?

- Current system in place works
- Structural planning
- Special recruitment
- New educational efforts



...NOT?

- Disease-specific
- Improves outcomes
- Specificity leads to a “Center of Excellence”



#VEGASSTRONG

A shift towards pediatric CICU

- Presence of a CICU is used as a measure of quality
- Models like this one have been successful in the adult population

1 WJCHS 2010;1:8-14

2 US news and world report www.rti.org/besthospitals



Variation in Models of Care Delivery for Children Undergoing Congenital Heart Surgery in the United States

World J Pediatr Congenit Heart Surg. 2010 April ; 1(1): 8–14.



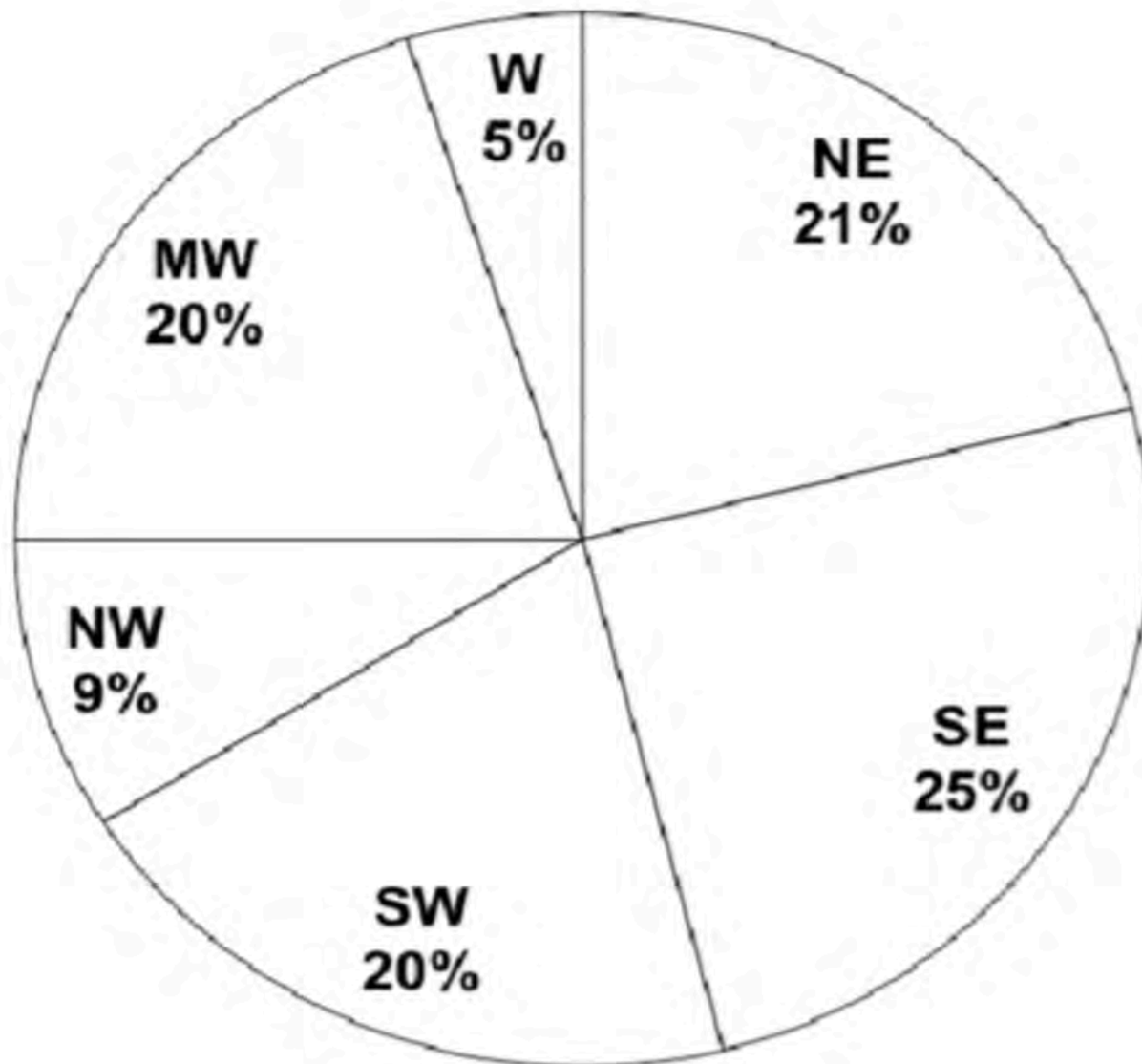


Figure 1.
Center Region. NE = Northeast, SE = Southeast, SW = Southwest, NW =
Midwest, and W = West



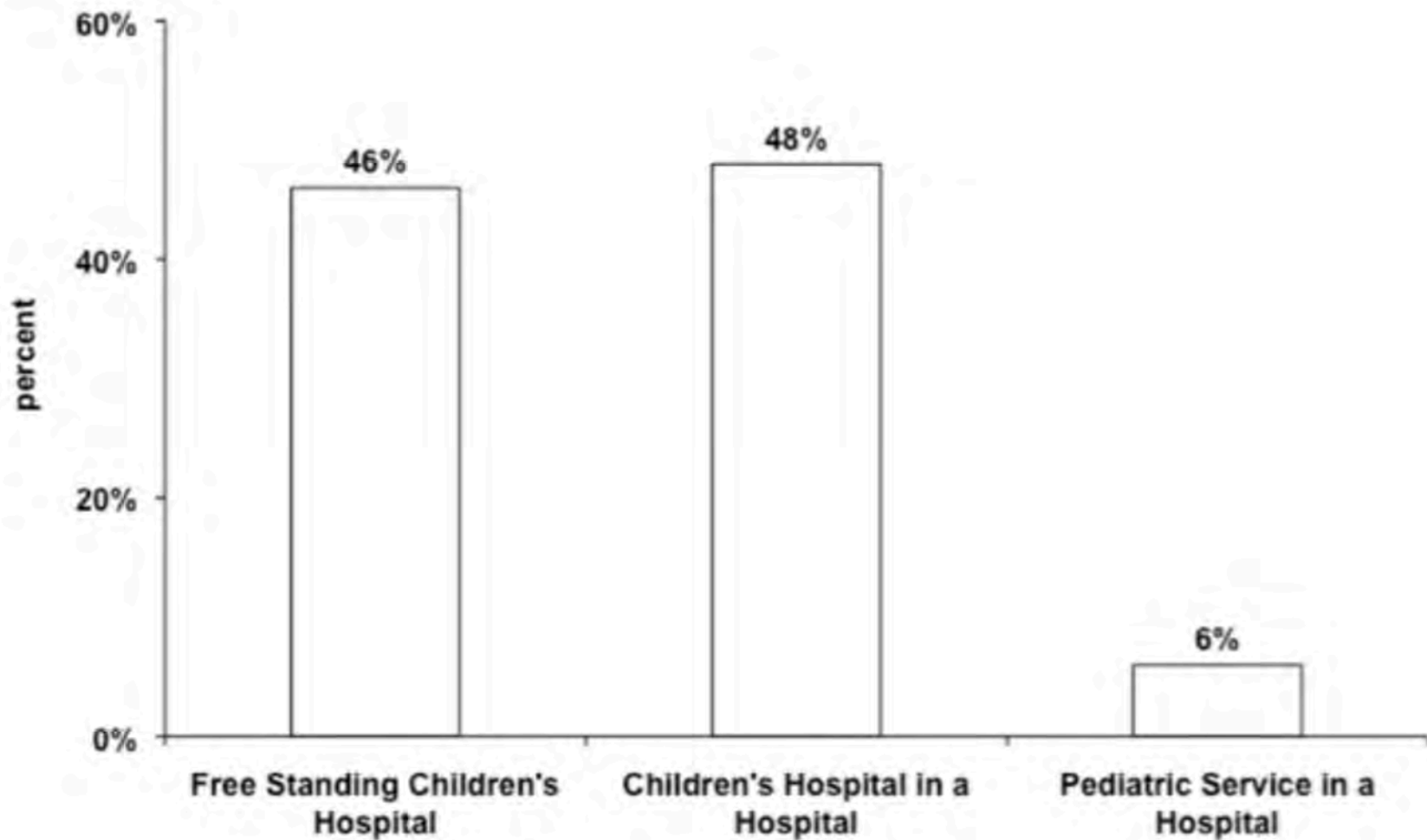


Figure 3.
Center Type.

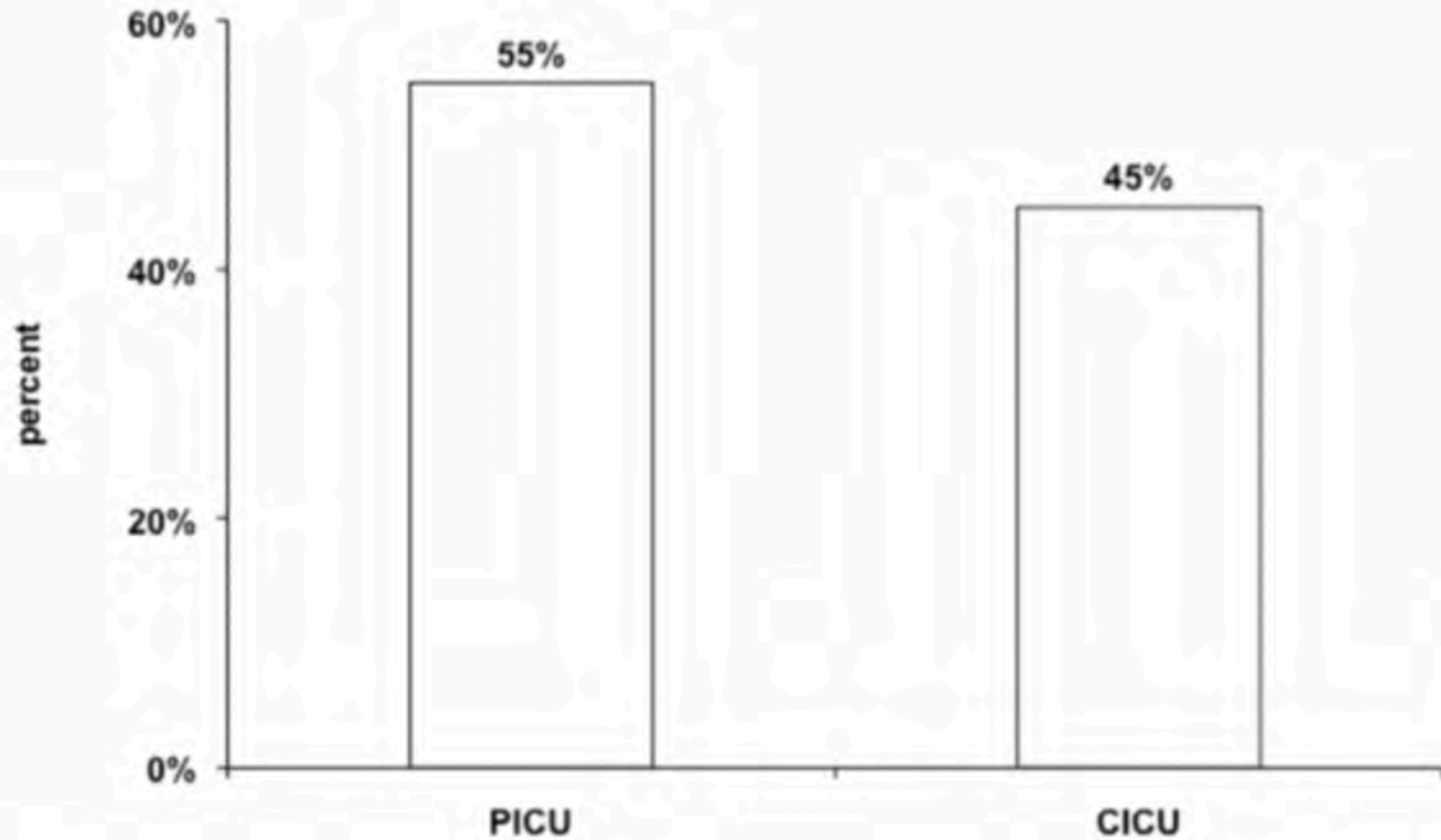


Figure 4.

Type of Intensive Care Unit. PICU = pediatric intensive care unit, CICU = pediatric cardiac intensive care unit

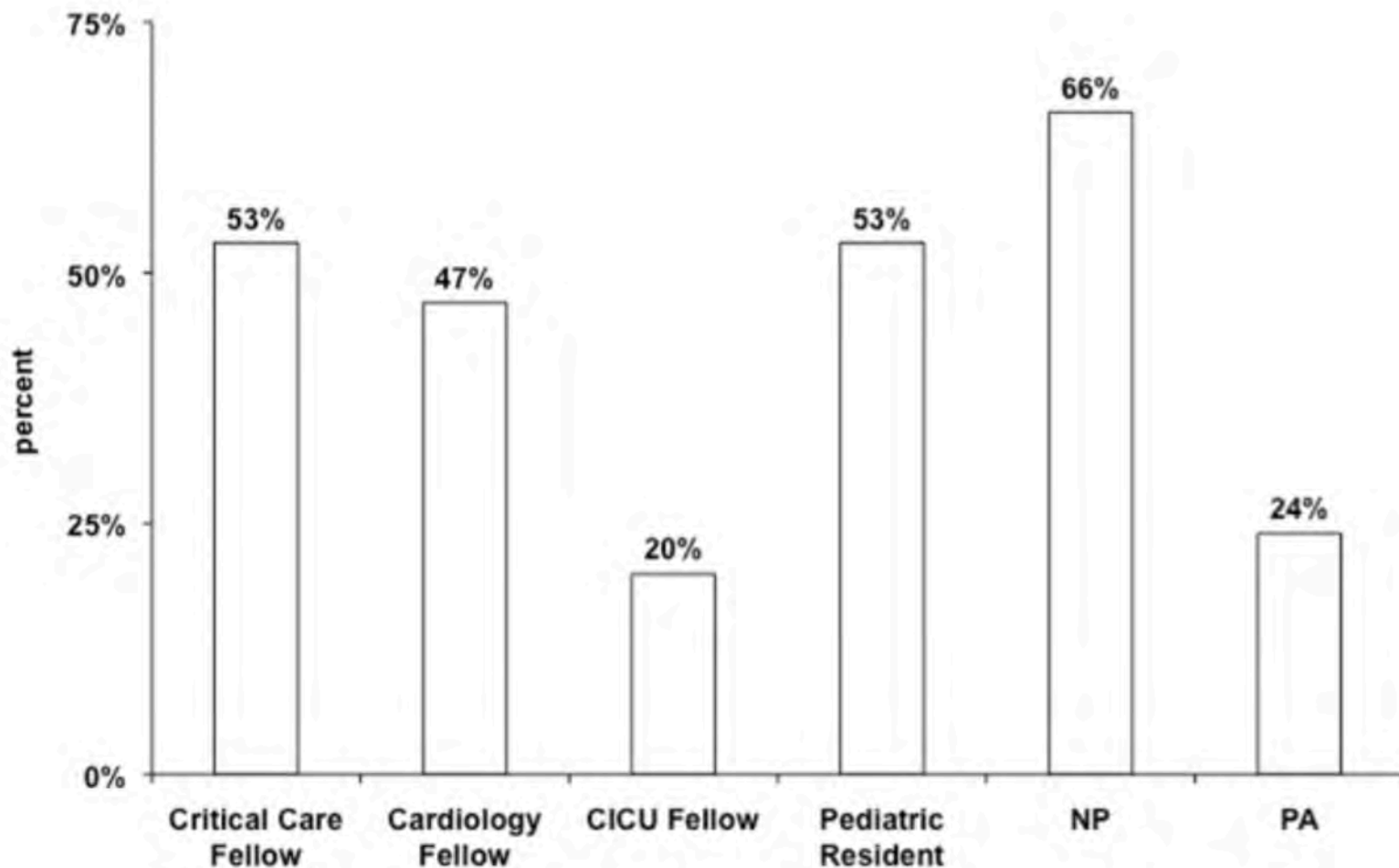


Figure 6.

Trainees and Physician Extenders involved in Post-operative Care. CICU = cardiac intensive care unit, NP = nurse practitioner, PA = physician assistant



Care Models and Associated Outcomes in Congenital Heart Surgery

Pediatrics 2011;127:e1482–e1489



TABLE 2 Unadjusted Outcomes, Overall and Stratified by STS-EACTS Risk Category

Variable	Overall, <i>n</i> = 20922	CICU, <i>n</i> = 14037	Other ICU, <i>n</i> = 6885	<i>P</i>
In-hospital mortality, <i>n</i> (%)				
Overall	748 (3.8)	500 (3.6)	284 (4.1)	.04
STS-EACTS 1	40 (0.5)	20 (0.4)	20 (0.8)	.05
STS-EACTS 2	116 (2.0)	69 (1.8)	47 (2.4)	.13
STS-EACTS 3	75 (3.0)	38 (2.2)	37 (4.9)	<.001
STS-EACTS 4	360 (8.5)	237 (8.1)	123 (9.5)	.12
STS-EACTS 5	193 (19.6)	136 (18.5)	57 (22.9)	.14
Postoperative length of stay, median (interquartile range)				
Overall ^a	6 (4–13)	6 (4–13)	6 (4–13)	<.01
STS-EACTS 1	4 (3–6)	4 (3–6)	4 (3–6)	.14
STS-EACTS 2	6 (4–11)	6 (4–10)	6 (4–11)	.06
STS-EACTS 3	8 (5–15)	8 (5–15)	8 (5–15)	.89
STS-EACTS 4	12 (7–24)	12 (7–23)	13 (7–26)	.25
STS-EACTS 5	25 (14–46)	24 (14–43)	30 (16–52)	.03
Postoperative complications, <i>n</i> (%)				
Overall	4291 (20.5)	2879 (20.5)	1412 (20.5)	.99
STS-EACTS 1	764 (10.2)	473 (9.7)	291 (11.0)	.08
STS-EACTS 2	925 (16.2)	608 (16.1)	317 (16.4)	.80
STS-EACTS 3	612 (24.7)	410 (23.9)	202 (26.6)	.15
STS-EACTS 4	1438 (34.0)	979 (33.3)	459 (35.5)	.16
STS-EACTS 5	552 (56.1)	409 (55.7)	1	

^a 10% trimmed means for length of stay. Overall: 8.5 days, CICU: 8.5 days, other ICU: 8.4 days.

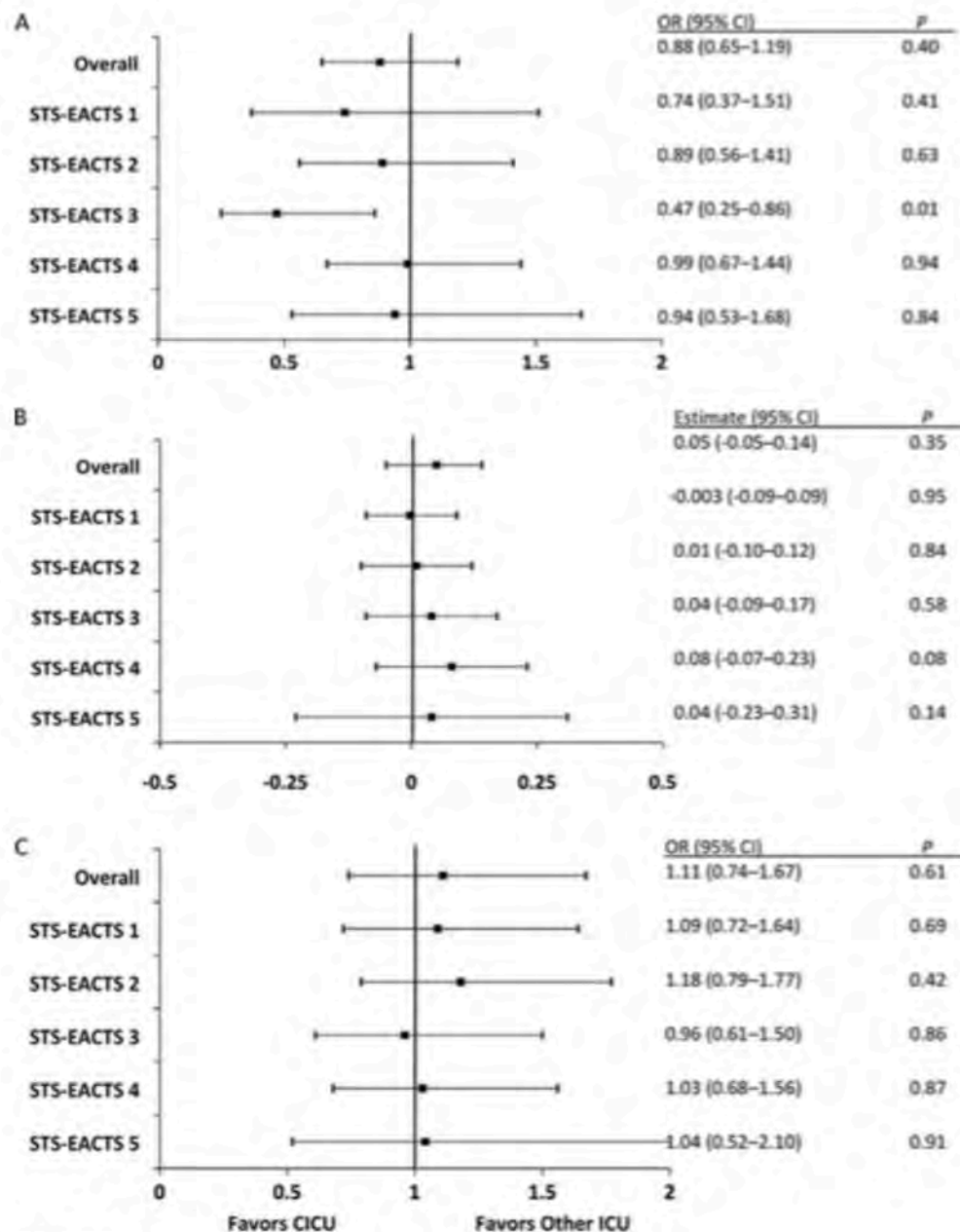


FIGURE 1

Adjusted outcomes associated with a CICU; overall and stratified by STS-EACTS risk category. A, In-hospital mortality. B, Postoperative length of stay (log days). C, Postoperative complications. Indicates odds ratio; CI, confidence interval.





Noncardiac Challenges in the Cardiac ICU: Feeding, Growth and Gastrointestinal Complications, Anticoagulation, and Analgesia

**David A. Hehir, MD, MS¹, R. Blaine Easley, MD^{2,3},
and Jonathan Byrnes, MD⁴**

World Journal for Pediatric and
Congenital Heart Surgery
2016, Vol. 7(2) 199-209



Section 1: Feeding, Growth, and Gastrointestinal Complications in the Cardiac Intensive Care Unit

Preoperative Feeding in CHD

Feeding Dysfunction in CHD

Growth Failure in Single Ventricle Infants

Impact of NEC in the CICU

Feeding Protocols for Patients With CHD



Section 2: Sources of Noncardiac Pain in the CICU

Prevalence of Cardiac and Noncardiac Pain in the Pediatric Cardiac Patient

Pain and Sedation Assessment and Treatment

Plans to Improve Analgesic and Sedative Management With an Eye on Outcomes



Sustainability of protocolized handover of pediatric cardiac surgery patients to the intensive care unit

Kristin Chenault¹, Michael-Alice Moga^{2,3}, Minah Shin⁴, Emily Petersen⁵, Carl Backer⁵,
Gildasio S. De Oliveira Jr⁶ & Santhanam Suresh¹

Pediatric Anesthesia **26** (2016) 488–494



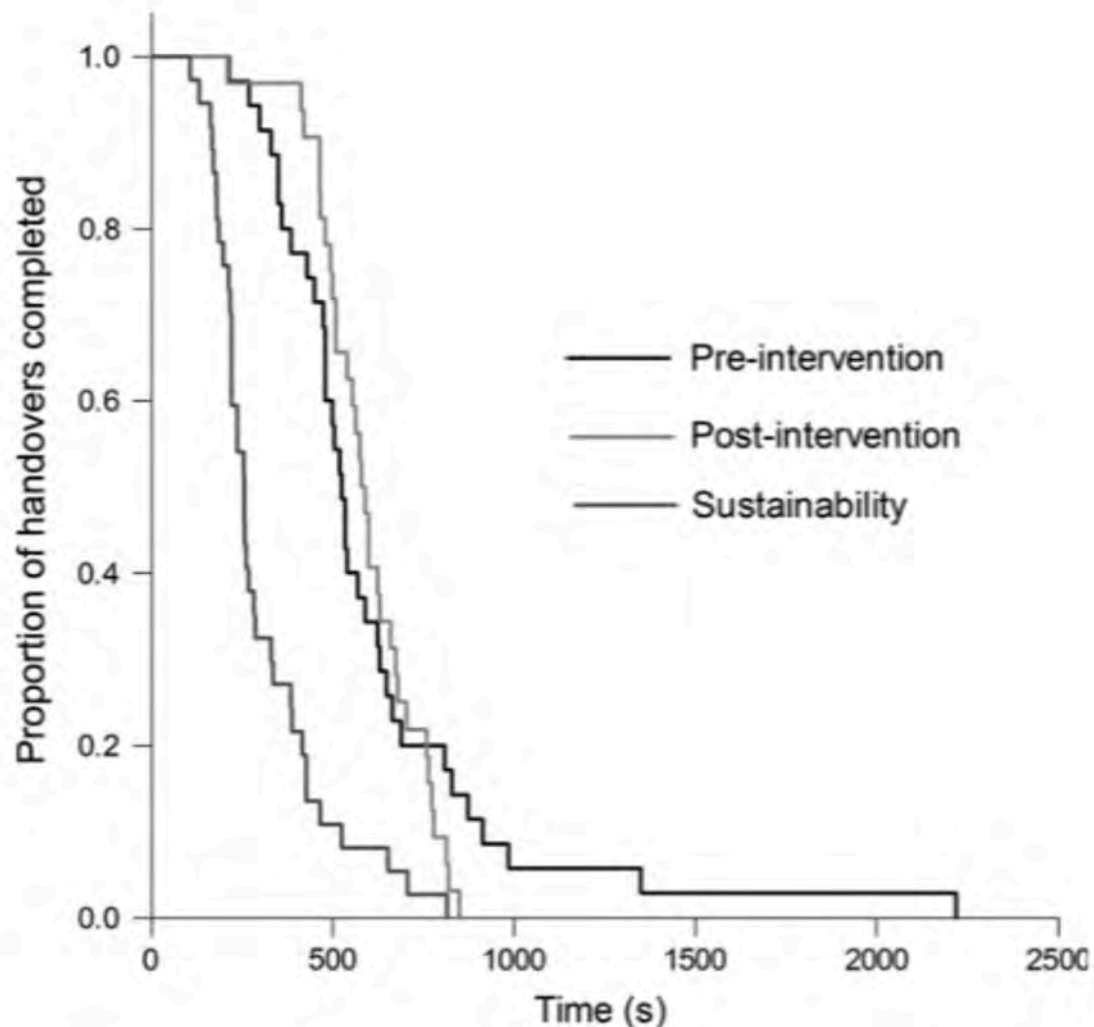


Figure 2 Kaplan-Meier plots of the proportion of completed handovers by study groups. The time to completion was significantly shorter in the sustainability phase compared to the preintervention and postintervention phases, median [Interquartile range (IQI) 256 (213–385) s, 525 (430–665) s, and 585(498–693) s, respectively, $P < 0.001$.



Outcome of cardiopulmonary resuscitation in a pediatric cardiac intensive care unit

David A. Parra, MD; Bala R. Totapally, MD; Evan Zahn, MD; Jeffrey Jacobs, MD; Abdul Aldousany, MD; Redmond P. Burke, MD; Anthony C. Chang, MD

(Crit Care Med 2000; 28:3296–3300)



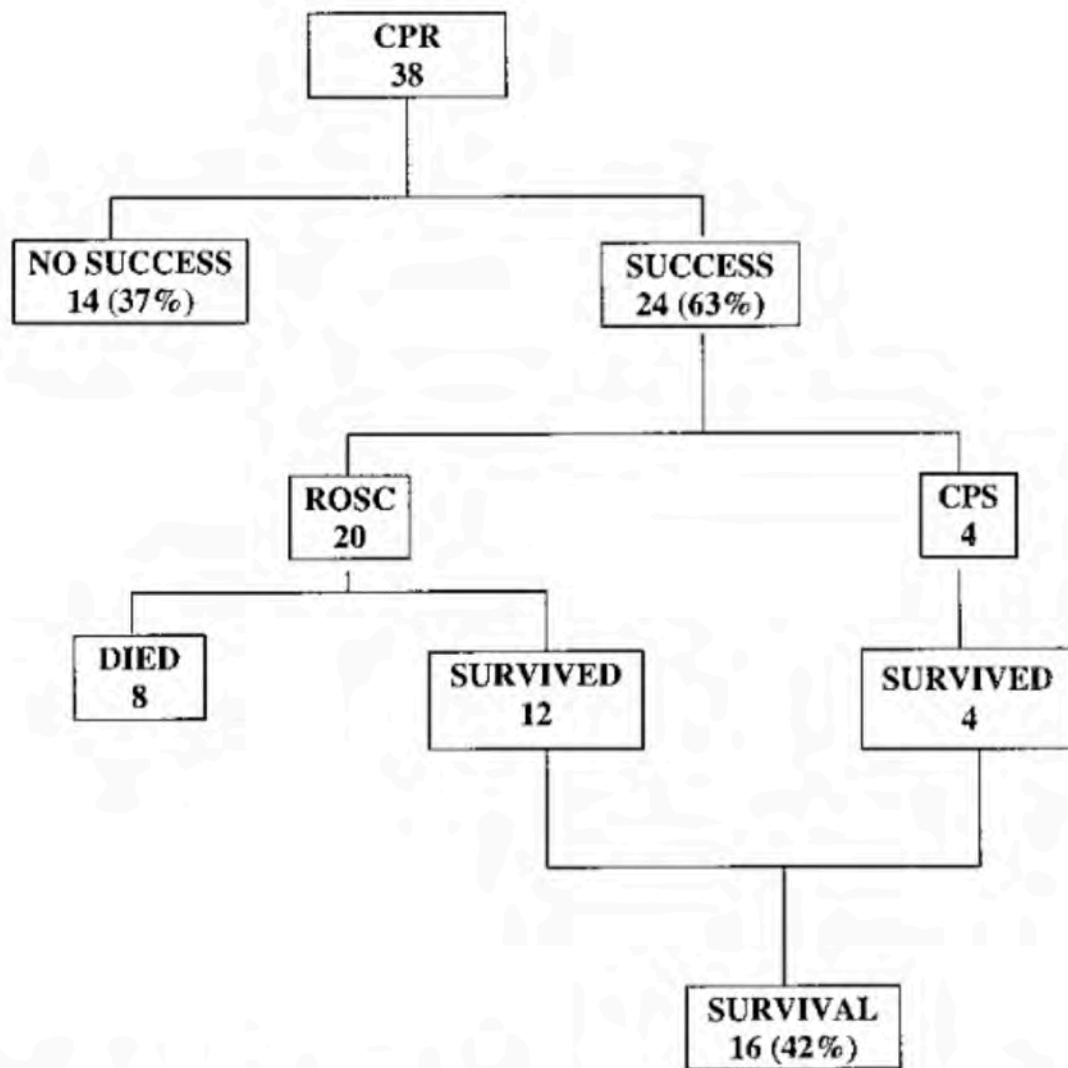


Figure 1. Outcome of cardiopulmonary resuscitation (*CPR*) in a pediatric cardiac intensive care unit. *ROSC*, return of spontaneous circulation; *CPS*, cardiopulmonary support.

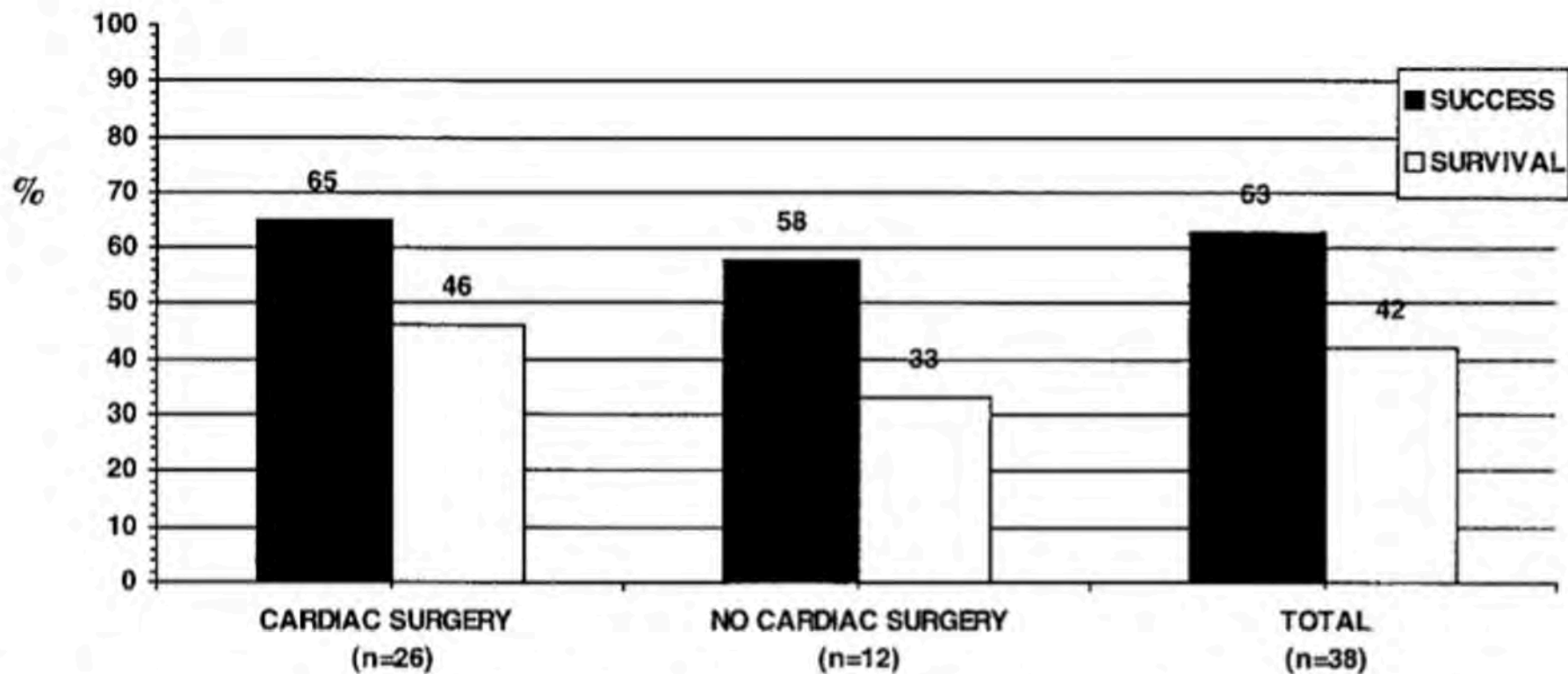


Figure 3. Success and survival in cardiopulmonary resuscitation patients with and without previous cardiac surgery.

W*e advocate the
use of me-
chanical car-
diopulmonary support sys-
tems to increase the success
and survival rates of cardio-
pulmonary resuscitation.*



Developmental Care in North American Pediatric Cardiac Intensive Care Units

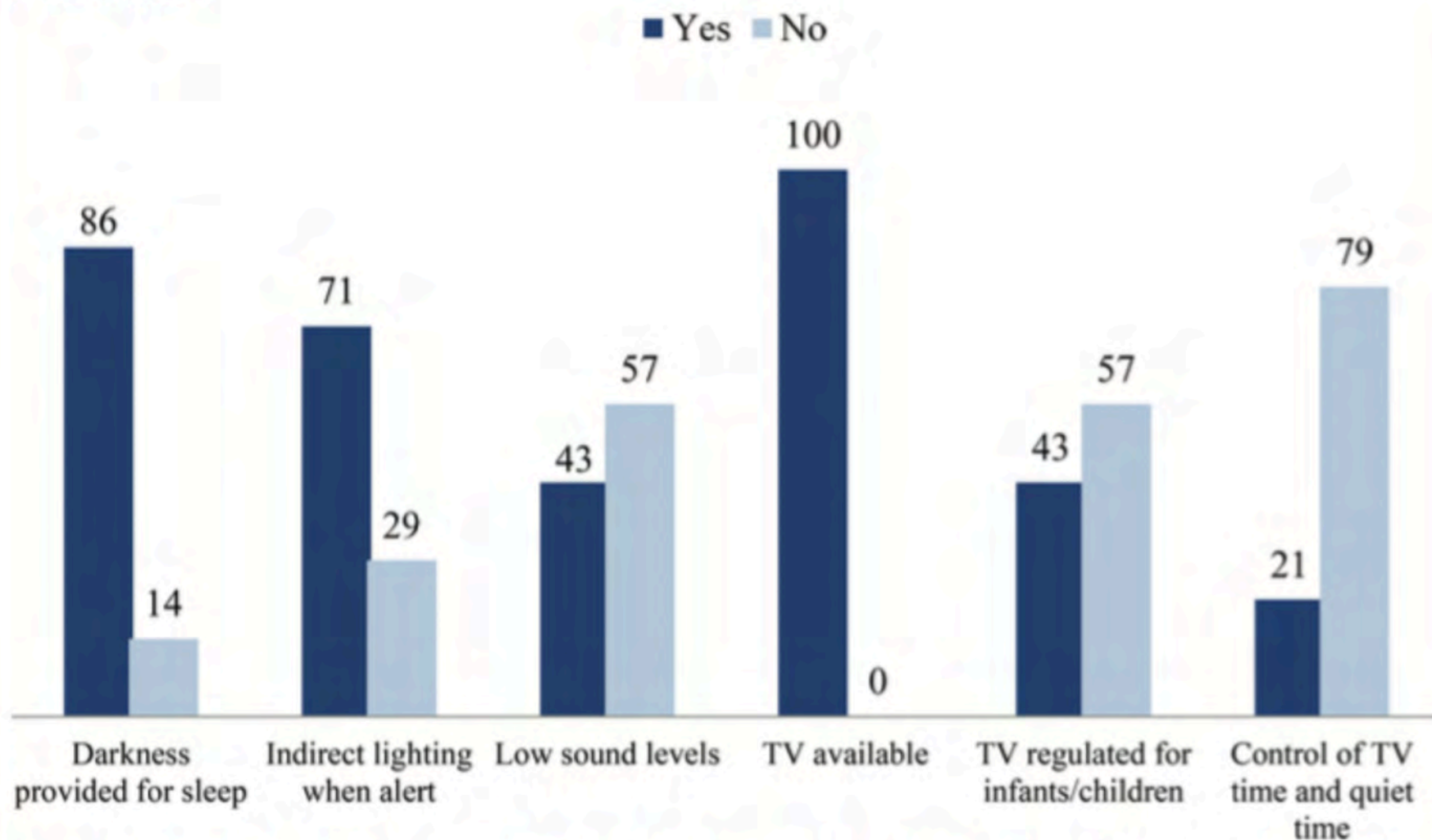
Survey of Current Practices

Erica Sood, PhD; Wilma M. Berends, MSN; Jennifer L. Butcher, PhD; Amy J. Lisanti, PhD, RN; Barbara Medoff-Cooper, PhD, RN, FAAN; Jayne Singer, PhD; Elizabeth Willen, PhD; Samantha Butler, PhD

Advances in Neonatal Care • Vol. 16, No. 3 • pp. 211-219



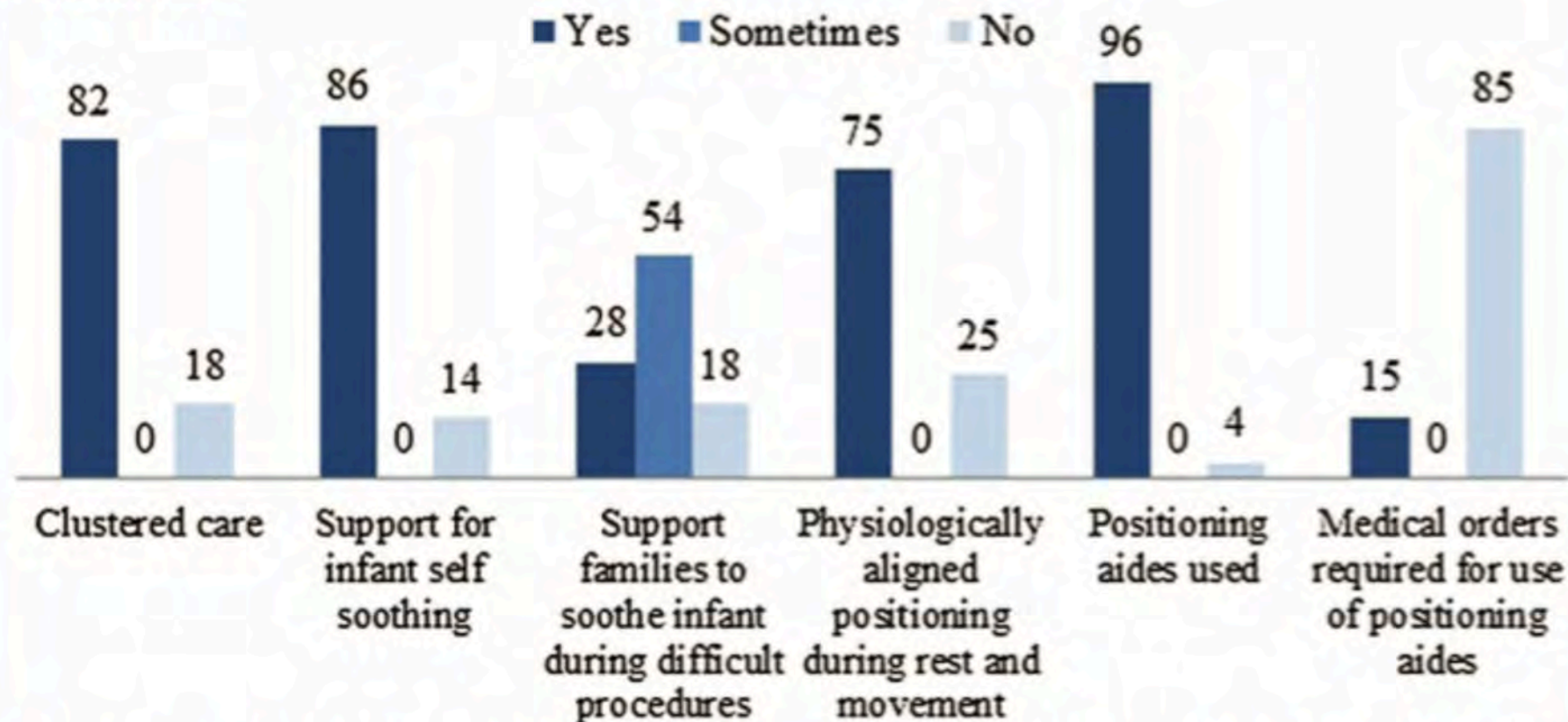
FIGURE 1



Environmental adaptations. Amounts are represented as percentages.

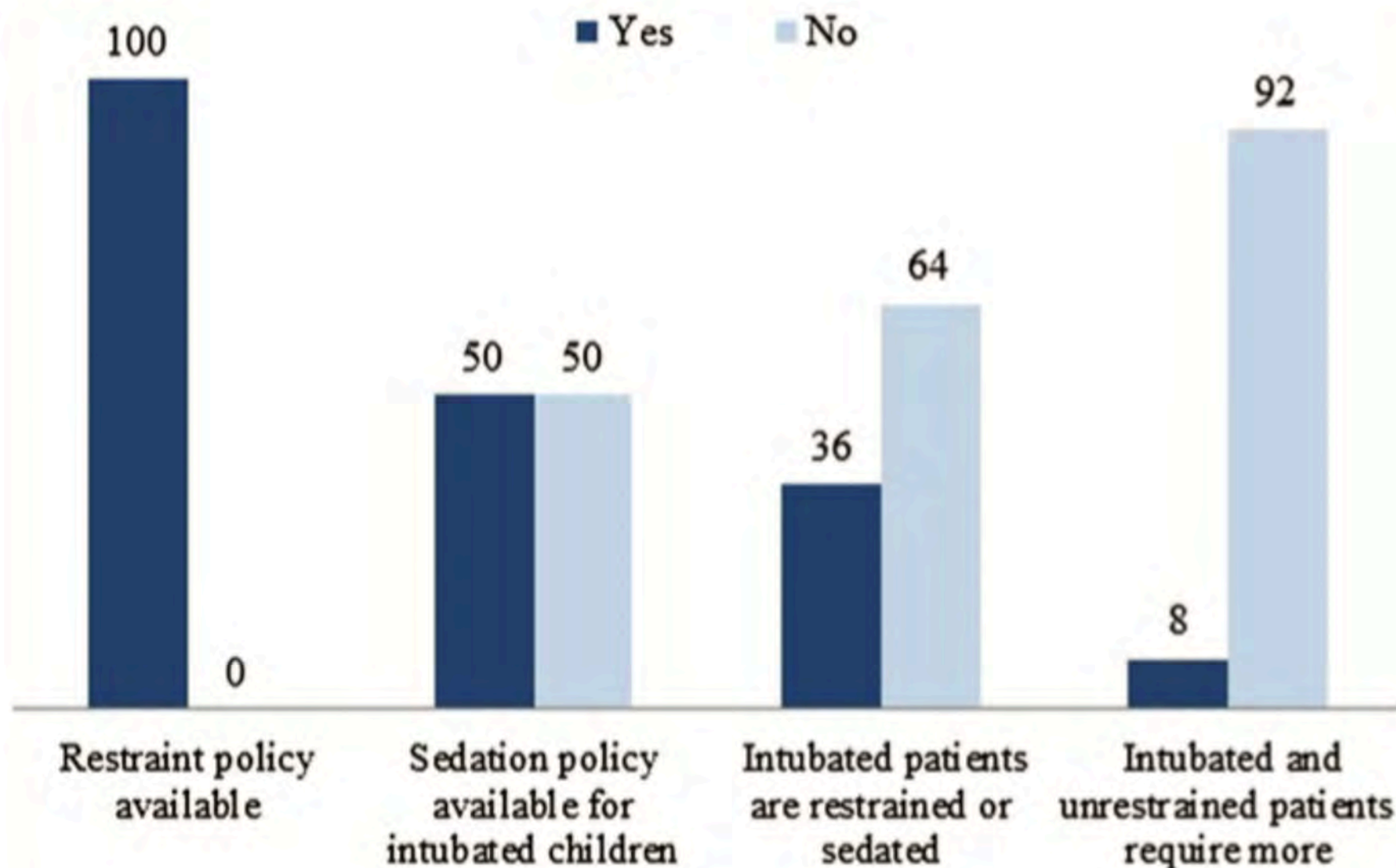


FIGURE 2



Implementation of developmentally based infant care. Amounts are represented as percentages. N = 28.

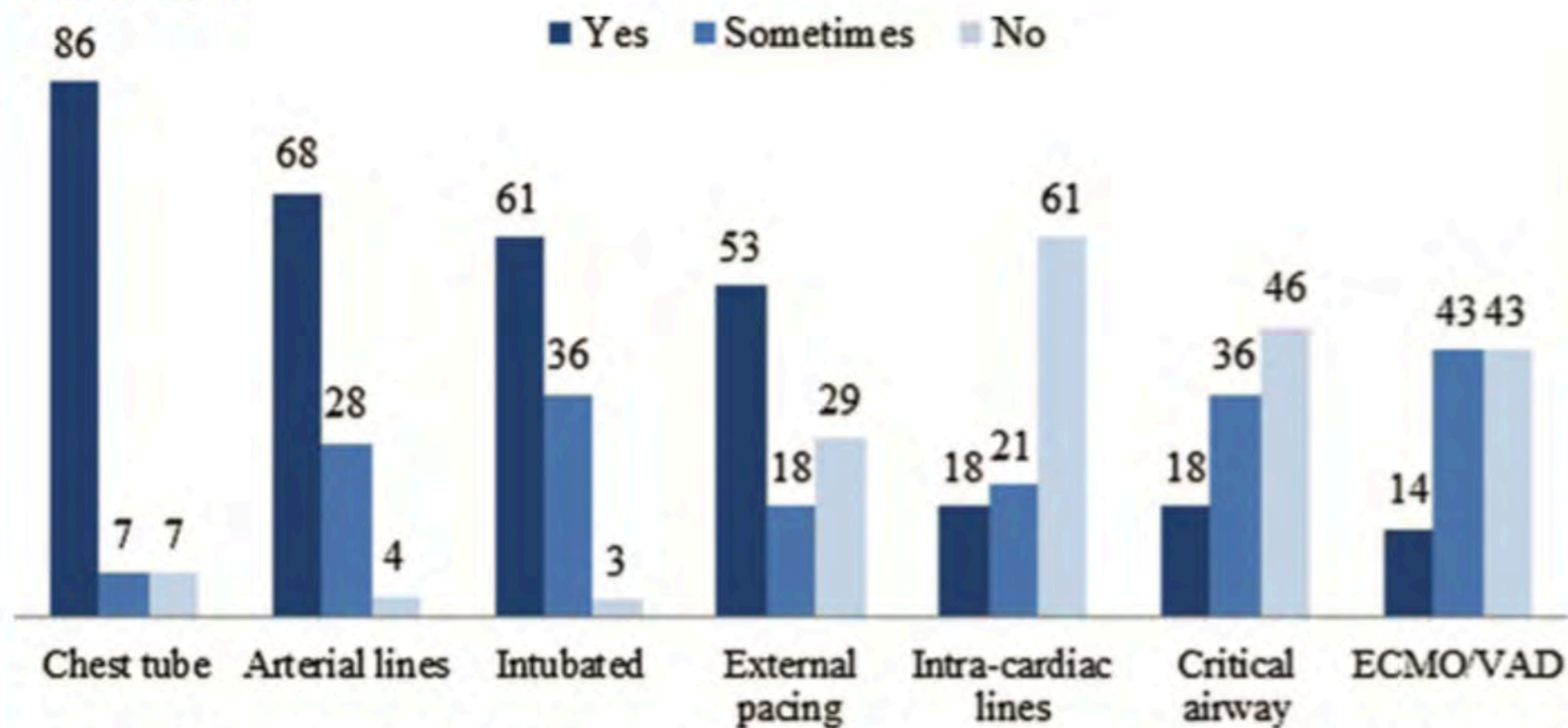
FIGURE 3



Restraint and sedation use. Amounts are represented as percentage



FIGURE 4



Infant holding. Amounts are represented as percentages. N = 28. ECMO, extra-corporeal membrane oxygenation; VAD, ventricular assist device.

Summary of Recommendations for Practice and Research

What we know:

- Efforts to promote developmental care have been initiated within most North American dedicated pediatric CICUs.
- However, developmental care practices tend to be inconsistent within and across CICUs.
- Strengths across CICUs include regulating light, clustering care, facilitating self-soothing during difficult procedures, and supporting positioning during rest and movement.
- Challenges across CICUs include regulating sound/television, reducing the use of sedation and restraints, engaging in infant holding, and involving parents in developmental care.

What needs to be studied:

- Impact of developmental care practices on neurodevelopmental and medical outcomes of infants with congenital heart disease.
- Strategies to enhance the parental role and promote parental involvement in developmental care during the CICU stay.
- Development of best practice guidelines regarding CICU developmental care.

What we can do today:

- Provide time and resources for developmental care in the CICU, including staff education.
- Formalize integration of family into infant caregiving, including participation in medical and developmental rounds.
- Facilitate parent education programs and parent to parent support.
- Formalize developmental care policies.



Patient density, nurse-to-patient ratio and nosocomial infection risk in a pediatric cardiac intensive care unit

LENNOX K. ARCHIBALD, MD, MARY LOU MANNING, PHD, LOUIS M. BELL, MD, SHAILEN BANERJEE, PHD AND WILLIAM R. JARVIS, MD

Pediatr Infect Dis J, 1997;16:1045-8



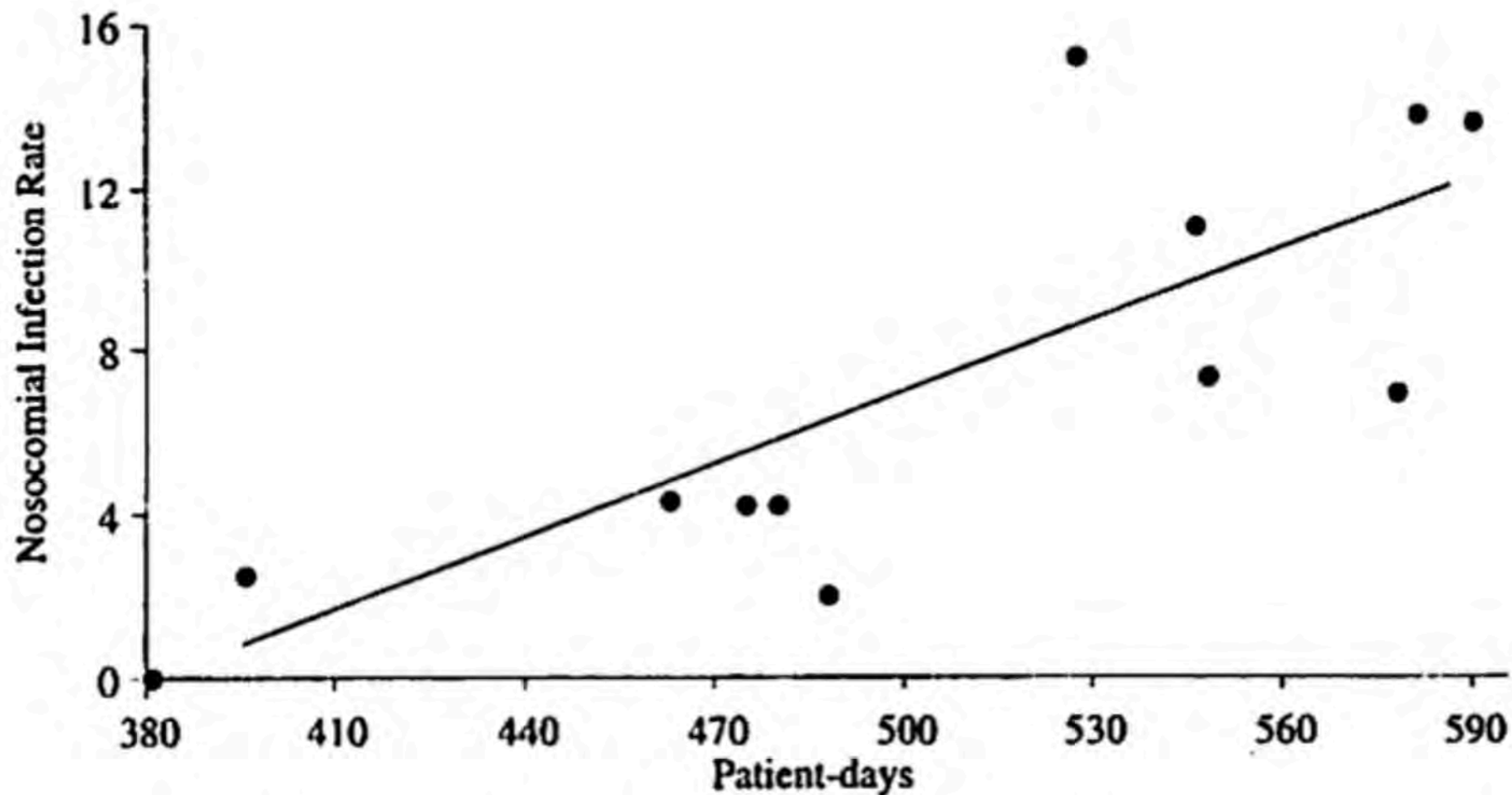


FIG. 1. Scatter plot of nosocomial infection rate (dependent variable) *vs.* monthly patient days (independent variable), January through December, 1995. Pearson's correlation coefficient = 0.89 ($P = 0.0001$).



Nurses' Job Satisfaction, Stress, and Recognition in a Pediatric Setting

**Mary E. Ernst
Michelle Franco**

**Patricia R. Messmer
Jacqueline L. Gonzalez**

PEDIATRIC NURSING/May-June 2004/Vol. 30/No. 3



Figure 1. Modification of Bratt, Broome, Kelber, and Lostocco's (2000) Model

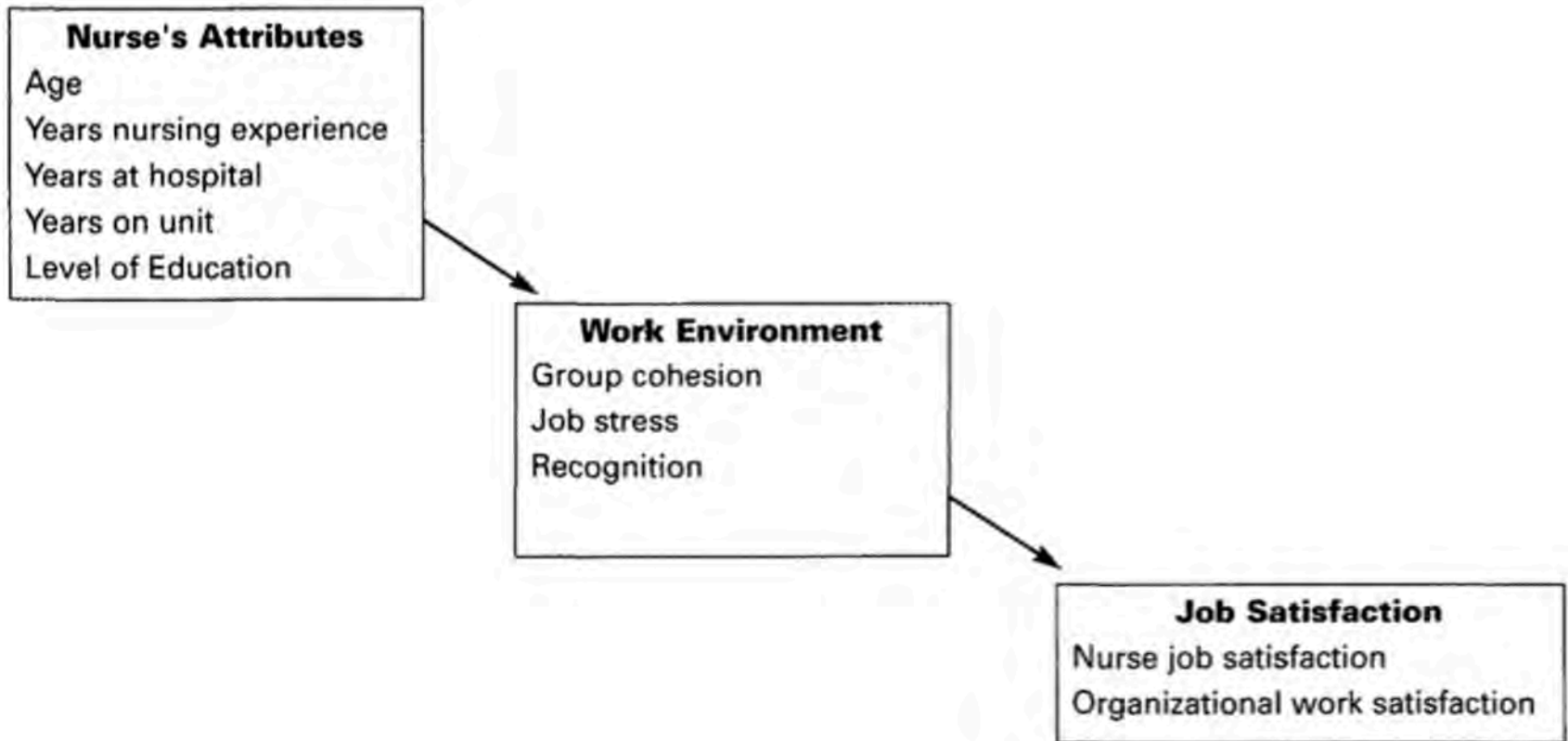


Table 1. Demographics

Nurses	Gender	Age	Education Level	Years Nursing	Years on Unit	Years in the Organization
<i>Gender</i>						
Female	225 (91%)					
Male	18 (7%)					
Missing	6 (2%)					
Total	249					
<i>Age</i>						
22-27		39				
28-33		50				
34-39		54				
40-45		37				
46-51		38				
52-58		15				
Missing		16				
Total		249				
<i>Education Level</i>						
Diploma			24 (10%)			
ADN			69 (28%)			
BSN			120 (50%)			
MSN+			28 (11%)			
Missing			8 (1%)			
Total			249			
<i>Experience</i>						
< 1 year				18	37	20
1-5 years				68	111	84
6-10 years				38	58	47
11-15				41	24	53
16-20				24	~	~
> 20 years				53		
Missing				7		
Total				249	249	249



Table 3. Correlation Matrix Among Scales

Correlations	Job Satisfaction	Organizational Work Satisfaction			Job Stress	Recognition
		Pay	Interaction/ Cohesion	Task Requirement		
Job Satisfaction	1	.427*	.408*	.669*	.644*	.011
Job Stress	.644*	.402*	.438*	.534*	1	-.031
Pay	.427*	1	.257*	.269*	.402*	-.025
Interaction/Cohesion	.408*	.257*	1	.227*	.438*	-.117
Task Requirements	.669*	.269*	.227*	1	.534*	.150*
Recognition	.011	-.025	-.117	.150*	-.031	1

Note: * Correlations significant at the .05 level.



CONCLUSIONS

- Dedicated Pediatric CICU is feasible, safe and necessary
- Current quality metrics support national trend
- Caring for our Allied Health Personnel is critical



“The test of a first-rate intelligence is the ability to hold two opposed ideas in mind at the same time and still retain the ability to function.”



F. Scott Fitzgerald



SUMMER 2018!!!