

Association of Resident Inpatient Workload and Patient Outcomes

Robert Dudas MD
Zachary Anthony BA
Steven Kennedy MD

Johns Hopkins All Children's Hospital



JOHNS HOPKINS
MEDICINE

Disclosure of Financial Relationships

- None

Background

- There is a recognized tension between service and education which has led to calls to more carefully examine the way residents are trained (Turner).
- Recently, medical educators have evaluated the impact of duty hours on resident education and patient outcomes (Bolster, Landrigan).



Background

However, less attention has been paid to the impact of resident workload. High resident workload has been associated with:

- decreased participation in educational activities
- increased medical errors
- increased mortality

while decreased workload is associated with:

- increased resident satisfaction
- increased time for educational activities and teaching



Aim

As part of an effort to create a more educationally-focused model for inpatient care we created an inpatient team with a reduced workload for a residency program in pediatrics. We sought to compare the impact of this intervention on patient outcomes including; length of stay and 30 day readmissions.



Methods-Setting

Johns Hopkins All Children's Hospital (JHACH) is a 259 bed hospital with approximately 4,500 annual admissions to the general inpatient service. Patients are distributed across 4 teams; three of the teams include a hospitalist, medical students, interns and residents while the fourth team is a nonresident team and staffed solely by hospitalists.



Methods

JHACH supports the training for 2 pediatric residency programs. On one of the 3 resident teams the ratio of patients to interns is capped at 4:1. On the other 2 teams the ratio is capped at 7:1. Additional overflow patients are placed on the non-resident team.

4:1
3 interns
12 patients

7:1
2 interns
14 patients

7:1
2 interns
14 patients

Attending
only



Methods

- We reviewed hospital administrative data collected over a 1 year period from July, 2015-July, 2016.
- Patient characteristics
 - Demographic data
 - Case Mix Index adjusted for length of stay
- Patient outcomes included
 - average length of stay
 - 30-day all-cause readmission rates



Methods-Statistical Analysis

We compared baseline demographic data between patients assigned to both teams. We used Student's t-test for continuous variables and chi-square analyses for categorical variables. Statistical significance was set at $p < .05$



Results

VARIABLE	PATIENT CHARACTERISTICS			
	intervention	control	p-value	Combined
No. patients	1453	2778		4231
Female sex n (%)	704 (48.5)	1313 (47.3)	.46	2074 (47.6)
Race or ethnic group n (%)			.97	
White	828 (57.0)	1609 (57.9)		2518 (57.8)
Black	297 (20.4)	550 (19.8)		864 (19.8)
Hispanic	222 (15.3)	418 (15.0)		655 (15.0)
Other	91 (6.3)	169 (6.1)		273 (6.3)
Age mean years (SD)	7.49 (6.35)	7.40 (6.28)	.66	7.42 (6.30)
Insurance n (%)			.55	
Private	423 (29.1)	763 (27.5)		1231 (28.2)
Medicaid	1020 (70.2)	1984 (71.4)		3087 (70.8)
-Medicare	2 (0.1)	8 (0.3)		10 (0.2)
None	6 (0.4)	17 (0.6)		23 (0.5)
Other	2 (0.1)	6 (0.2)		8 (0.2)
Ava CMI	1.2	1.2	.31	1.2



Results

VARIABLE	PATIENT OUTCOMES			
	intervention	control	p-value	Combined
No. patients	1453	2778		4231
LOS (hr)	65.7	67.8	.16	66.2
30-day readmits n (%)	134 (9.2%)	174 (6.2%)	.60	313 (7.4%)
Deaths n (%)	21 (1.4)	26 (0.9)	.13	50 (1.1)



Results

	VARIABLE	INTERVENTION	CONTROL	p-value	COMBINED
INPATIENT		799	1543		2342
	30-day readmits n (%)	94 (11.7%)	119 (7.7%)	.67	213 (9.1%)
	Avg LOS (hr)	96.0	96.7	.15	95.5
OBSERVATION		654	1235		1889
	30-day readmits n (%)	40 (6.1%)	55 (4.5%)	.66	98 (5.2%)
	Avg LOS (hr)	28.7	31.9	.01**	30.6



Discussion

- Case mix index suggests equal medical complexity across teams.
- Decreasing the inpatient workload of pediatric residents was associated with a 10% decreased length of stay (3 hours) for patients in observation status.
- Decreased resident workload was associated with a 3% increase in 30-day all-cause readmission rates but this was not statistically significant.



Limitations

- An open educational intervention is subject to a diverse array of confounding factors
- Differences in residency programs, though same group of attending physicians.



Conclusions

Decreasing the inpatient workload of pediatric residents was associated with a 10% decreased length of stay for patients in observation status. There was no effect on 30 day readmission rates.



Next Steps

Staffing a team with a reduced patient load is associated with increased costs. There is potential to offset those costs with financial savings from efficiencies gained.

Anecdotal evidence suggests that residents with decreased workload may increase time documenting in the EMR.



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