

Transitional Neonatology: Optimizing Care for Older Patients who Transition from the NICU to the PICU

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BACKGROUND

Survival for high risk Neonatal Intensive Care Unit (NICU) patients is increasing. As these patients survive longer and enter the pediatric age range their medical needs change. Across the United States, there is high variability in the approach to transitioning these patients from the NICU to the Pediatric Intensive Care Unit (PICU). There is no literature characterizing the difference in care these patients receive before and after transition from the NICU.

PURPOSE

To understand the baseline characteristics of patients who are transferred from the NICU to the PICU or Transitional Intensive Care Unit (TICU) at Texas Children's Hospital (TCH) and compare treatment approaches as well as outcomes of interest before and after transfer.

METHODS

- Identified patients admitted to the NICU from 2010 to 2019 and discharged after 120 DOL who were transferred to the PICU or TICU during initial hospital stay.
- Transferred for one of the following:
 - Continuity of Care
 - Age
 - Discharge Planning
 - Management of Chronic Conditions (including respiratory disease)
- Excluded if transferred to an acute care floor or for one of the following:
 - Hospital policy regarding positive respiratory viral testing
 - Post-op recovery of significant operative procedure
 - Significant change in plan of care (CRRT, BMT, oncologic treatment etc.)
- Baseline characteristics of these patients and important clinical interventions done before and after transfer were obtained from the electronic medical record
- Data assessed for normality and paired T-tests or Wilcoxon signed rank tests were performed as appropriate

Baseline Demographics	
Gestational Age (mean, weeks)	27.6
Birth Weight (mean, grams)	1016.3
Male Gender (n)	10 (45.5%)
Location of Birth	
Outborn (n)	17 (77.3%)
Admitted on Date of Birth (n)	7 (31.8%)
Day of Life at Admission (mean)	63.8
Transfer Information	
Day of Life at Transfer (mean)	274.2
Over 6 months at Transfer (n)	19 (86.4%)
Over 8 months at Transfer (n)	12 (54/6%)
Over 11 months at Transfer (n)	4 (18.2%)
Transferred to PICU (n)	7 (31.8%)
Transferred to TICU (n)	15 (68.2%)
Summary	
LOS in NICU (mean, days)	212.3
LOS in PICU or TICU (mean, days)	91.1
Total LOS (mean, days)	305.2
Percentage of Stay in NICU (mean)	70.3%
Mortality (n)	2 (7.7%)

Table 1: Baseline descriptive information for the 22 cases included in the cohort.

Event Type	Mean/Median in PICU/TICU	Mean/Median in NICU	Difference (PICU/TICU - NICU)	P-value
Codes ²	0 (0-1)	0 (0-0)	0	0.031
Respiratory				
# of Vent Changes ¹	9.82 (7.74)	6.18 (6.45)	3.64	0.044
Average FiO ₂ ¹	40.69 (20.88)	39.90 (20.23)	0.80	0.788
Labs/Imaging				
ECHOs ²	1 (1-2)	1 (0-1)	0	0.080
CBCs ²	1.5 (1-5)	1 (0-3)	1.5	0.005
Chemistries ²	10 (5-12)	8 (2-12)	1	0.087
Blood Gases ²	8.5 (3-20)	6 (1-12)	2	0.067
Infectious Diseases				
Sepsis Evaluations ²	1.5 (1-2)	1 (0-1)	1	0.008
Positive Cultures ¹	0.86 (0.89)	0.23 (0.53)	0.64	0.012
Viral Studies Sent ²	1 (0-1)	0 (0-1)	1	0.055
Growth Velocity (g/kg) ¹	11 (11.19)	21.53 (12.20)	-10.3	0.013

1- represents normally distributed data, shown as means (standard deviations) and p-values from paired T-tests, 2- represents non-normally distributed data, shown as median (intra-quartile range) and p-values from Wilcoxon Signed Rank test

Table 2: Comparison of key clinical events in the days before and after transfer from the NICU to the PICU/TICU.

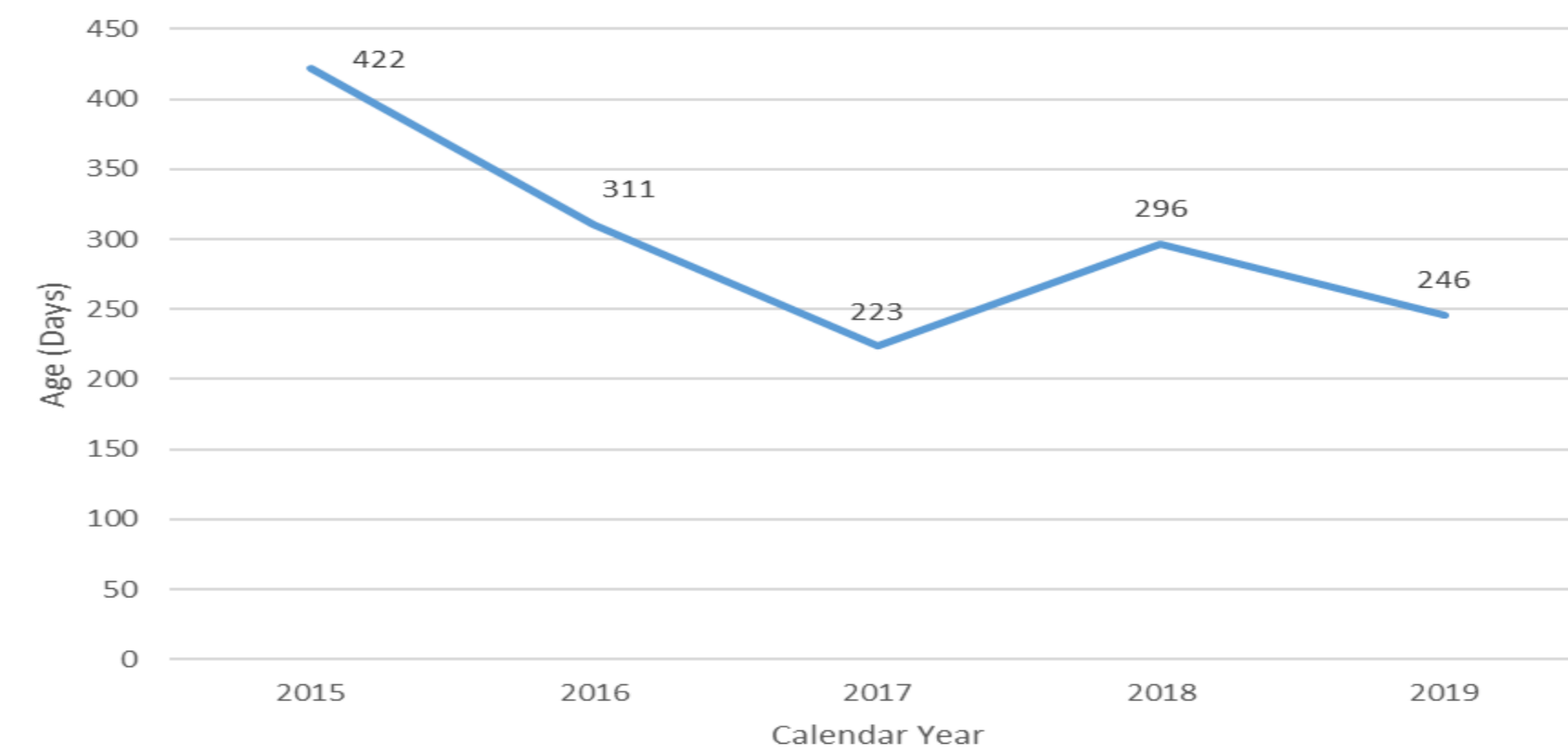


Figure 1: Average Age of Transfer from the NICU to the PICU/TICU for the patients in this cohort divided based on the year of transfer.

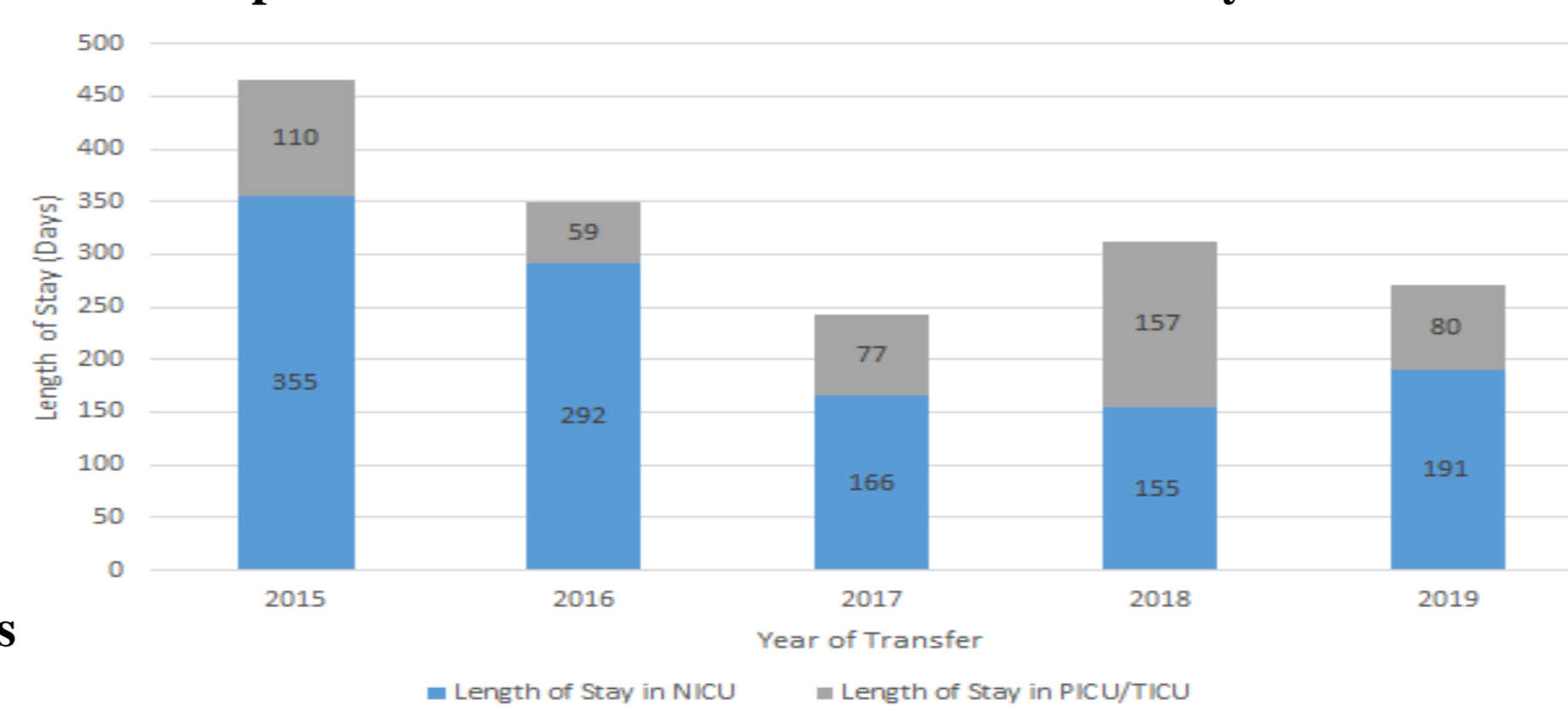


Figure 2: LOS based on year of transfer

RESULTS

- A total of 22 patients were evaluated
- Descriptive data is provided in Table 1
- Average age at transfer was 274.2 (\pm 132.8) days and decreased from 2015 to 2019 (Figure 1)
- Hospital length of stay decreased from 465 days in 2015 to 270 days in 2019 (Figure 2). The proportion of length of stay in the NICU also decreased from 85% in 2015 to 70% in 2019
- This cohort had statistically more frequent code events, ventilator changes, lab monitoring and sepsis evaluations with declining growth velocity in the days after transfer to PICU/TICU, when compared to before the transfer

CONCLUSION

Multidisciplinary and collaborative effort to transition older patients in the NCIU to the PICU/TICU is feasible and potentially affects hospital length of stay. Importantly, there are statistically significant differences in the care chronic NICU patients receive after transition. Further study will help us understand how the differences in management may impact patient outcomes.

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