

## INTRODUCTION

- Each year in the United States, 1.41% of infants born weigh less than 1500g and are classified as very low birthweight (VLBW)<sup>1</sup>
- VLBW infants are at risk for a myriad of comorbid conditions related to extreme prematurity.
- Cost of care for these infants' accounts for 30% of all costs related to newborn care in the United States<sup>2</sup>
- Recent research has demonstrated that a set of timed interventions in the first hour of infant life can help reduce the risk of long-term comorbidities. These interventions have been termed "The Golden Hour"<sup>3</sup>
- At St. Louis Children's Hospital (SLCH), a quality improvement team was developed to improve compliance to the GH protocol.

### PURPOSE STATEMENT

- The purpose of this QI project was to evaluate GH protocol compliance before and after a GH quality improvement team was initiated.

### PICOT

- In neonates born at a gestational age of less than 33 weeks (**P**), how has implementation of the Golden Hour QI team (**I**) affected the time to completion of optimal infant stabilization techniques (**O**) from 2019 (T1) to 2020 (T2) (**T**)?

### OBJECTIVES

1. 75% compliance rate with the Golden Hour protocol
2. 10% decrease in incidence of hypothermia in the first hour of life
3. 10% decrease in incidence of hypoglycemia in the first hour of life

## Golden Hour Protocol Goals

1. NICU admission by 20 minutes of life
2. Infant temperature taken in the delivery room, upon NICU admission, and at one hour of life
3. Infant temperature maintained  $\geq 36.5$  C
4. IV fluids and antibiotics initiated by 60 minutes of life
5. Blood glucose maintained  $\geq 50$  mg/dL

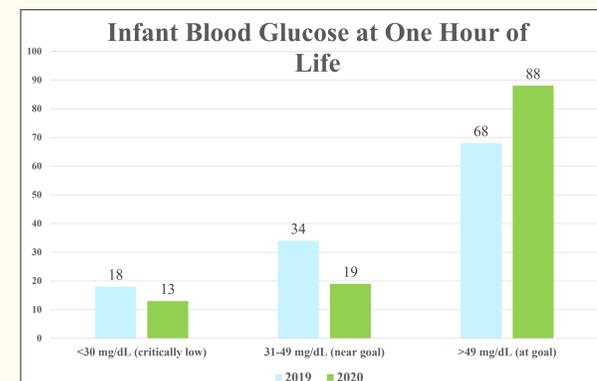
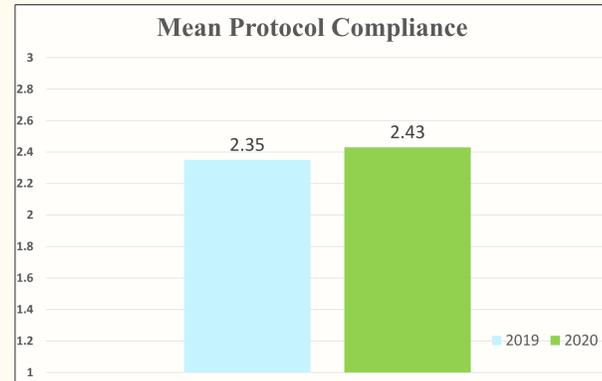
## ACKNOWLEDGEMENTS

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## MATERIALS AND METHODS



- **Setting:** Large level IV NICU in a non-profit urban hospital
- **Sample:** Purposive convenience sample utilizing simple random sampling of patients meeting inclusion criteria ( $n = 240$ )
- **Inclusion criteria:** Infants <33 weeks gestational age, born at Barnes Jewish Hospital
- **Exclusion criteria:** Infants > 33 weeks gestation at birth, born at an outside facility, congenital anomalies
- **Primary variable:** Overall protocol compliance
- **Secondary variables:** infant temperature, infant blood glucose, time to NICU admission, time to fluid and antibiotic initiation
- **Intervention:** Focused GH QI team; developed a GH newsletter, champions team, and checklist to improve workflow.
- **Data Collection and Analysis:** . Data collection via chart review
  - Sample size calculation based on a 95% confidence interval, 5% margin of error and population size of 172
  - Nominal level data was analyzed with the Chi-square Test of Independence and the  $\phi$  coefficient
  - Ratio level data was analyzed using Independent  $t$ -test.
  - IBM SPSS Statistic version 24 (Chicago, IL) was used for statistical analysis. Statistical significance was defined as  $p < .05$ .
  - The values of each secondary outcome variable were grouped into three categories: compliant (3), near compliant (2), and not compliant (1). These categories were used to generate a mean compliance score for level of compliance across all GH categories.



## RESULTS

### Overall Compliance

- Overall compliance increased from a mean compliance score in G1 of 2.35 ( $SD = .3$ ) to a score in G2 of 2.43 ( $SD = .3$ ),  $t(238) = -2.3, p = .02, d = .3$ .

### Admission Time

- Time from birth to NICU admission decreased from 31 minutes ( $SD = 9$ ) for G1 to 27.5 minutes ( $SD = 7.6$ ) for G2,  $t(238) = 3.2, p = .001, d = .4$ . Overall compliance with the target admission time of less than 20 minutes was also improved for G2 ( $n = 20$ ) compared to G1 ( $n = 10$ ),  $\chi^2(2, N = 240) = 6.6, p = .04, \phi = .2$ .

### Blood Glucose

- Blood glucose at one hour of life increased from 56 mg/dL ( $SD = 17.3$ ) for G1 to 63.2 mg/dL ( $SD = 19$ ) for G2,  $t(217) = -2.9, p = .004, d = -.39$ . Additionally, there were more infants with glucose at or above the goal of 50 mg/dL at one hour of life in G2 ( $n = 88$ ) compared to G1 ( $n = 68$ ),  $\chi^2(2, N = 240) = 2.6, p = .02, \phi = .2$ .

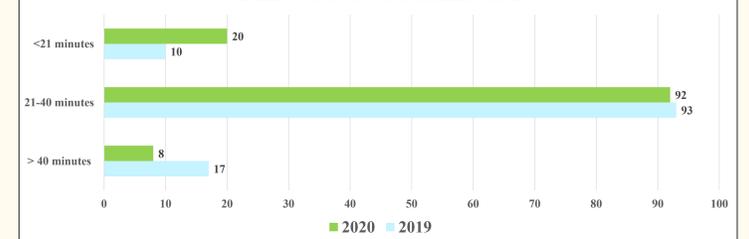
### Temperature

- There was no difference between groups for the mean infant temperature in the delivery room ( $p = .36$ ), on admission ( $p = .55$ ), or at one hour of life ( $p = .06$ ). There was no difference in number of infants at goal temperature in the delivery room ( $p = .21$ ), on admission ( $p = .42$ ), or at one hour of life ( $p = .31$ ).

### Antibiotic and Fluid Initiation

- There was no difference in the mean amount of time to TPN fluid initiation ( $p = .54$ ), number of infants with TPN initiated in less than 60 minutes ( $p = .78$ ), time to antibiotic initiation ( $p = .89$ ), or number of infants with antibiotics initiated in less than 60 minutes ( $p = .68$ ).

## Time to NICU Admission



## RESULTS

- **Predominant race:** Caucasian (49.6%,  $n = 119$ ), followed by Black or African American (45.8%,  $n = 110$ )
- **Predominant gender:** Male (54.6%,  $n = 131$ )
- **Predominant delivery type:** Cesarean section (72.1 %,  $n = 173$ )
- **Mean gestational age:** 28.0 weeks
- There was no statistically significant difference between groups for birthweight, gestational age, gender, race, delivery type, multiple gestation, or Apgar scores:

Variable	Statistic	2019	2020	p- value
Birthweight (grams)	mean (SD)	1159 (408)	1194 (427)	.52
Gestational Age (weeks)	mean (SD)	28 (2.4)	28 (2.3)	.87
Female gender	n (%)	61 (51 %)	48 (40 %)	.09
Caucasian race	n (%)	64 (53%)	55 (46%)	.48
Caesarean section	n (%)	93 (78%)	80 (67%)	.06
Singleton birth	n (%)	93 (78%)	92 (77%)	.88
Apgar 1 minute	median	5	4.5	.58
Apgar 5 minutes	median	7	7.5	.68

## CONCLUSIONS

1. **Objective met:** 75% protocol compliance met with a mean compliance score of 2.43/3 (81%)
  2. **Objective met:** 10% reduction in the rate of hypoglycemia was met with a reduction of 16%
  3. **Objective not met:** 10% reduction in the rate of hypothermia was not met, but a 2.9% reduction was achieved
- Implementation of a GH QI team showed improved protocol compliance in this study.
  - The intervention resulted in improved time to NICU admission and improved rates of hypoglycemia.
  - Rates of compliance with fluid and antibiotic initiation by one hour of life were very low in both the pre- and post- intervention groups, highlighting an area for future improvement.

## REFERENCES

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3. Morris, I., & Adappa, R. (2016). Early care of the preterm infant - current evidence. *Paediatrics and Child Health (United Kingdom)*, 26(4), 157-161. <https://10.1016/j.paed.2015.12.004>