

## Introduction

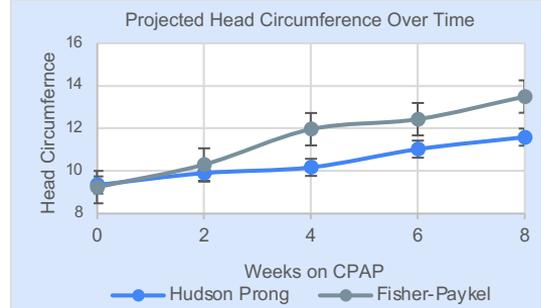
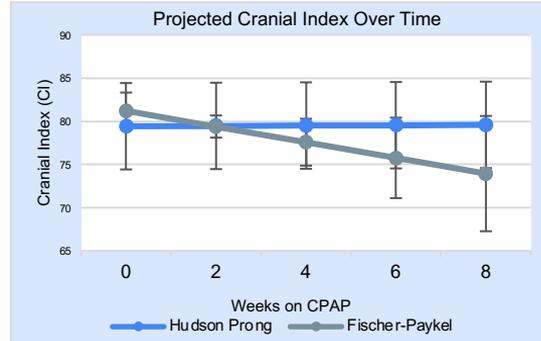
- Premature infants are susceptible to cranial molding
- Continuous Positive Airway Pressure (CPAP) devices can apply increased pressure to certain areas of the cranium and dictate infant position resulting. Dolichocephaly, a symmetrical narrowing of the head, has been linked to adverse motor outcomes and increased need for physical therapy following hospital discharge<sup>4,5</sup>.
- In 2019, the UNC Neonatal Critical Care Center (NCCC) made a change in type of CPAP device

## Objectives

1. To assess the impacts of two different CPAP devices on infant head shape and circumference.
2. To determine how CPAP device impacts infant positioning.
3. To determine if frequency in infant positional change impacts cranial molding.

## Methods

- Participants: 20 preterm infants <32 weeks gestation in the NCCC requiring CPAP. 10 used Hudson CPAP and 10 used Fisher Paykel CPAP.
- Cranial index (CI), a measure of head narrowing/dolichocephaly, and head circumference (HC) were obtained weekly by trained physical therapists and nurses.
- Infant positions (supine, sidelying, prone) were retrospectively reviewed in the medical chart.
- Covariates: birth weight, gestational age, days on CPAP, and hospital length of stay.
- This was a prospective cohort quality improvement project



Hudson CPAP



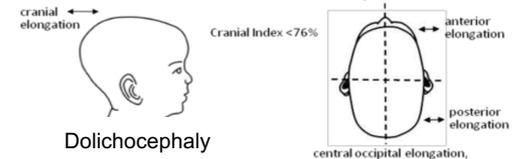
Fisher Paykel CPAP

## Results

- CI: 2 sample t-test indicated no group differences ( $p=0.61$ ); When probing the interaction of CI over time, Fisher Paykel projected more narrow CI. This was not significant ( $p=0.47$ ). (Chart 1).
- HC: 2 sample t-test revealed no statistically significant differences between groups ( $p=0.97$ ).
- When probing the interaction of HC over time, use of Hudson CPAP projected smaller HC. This was significant ( $p=0.007$ ). (Chart 2)
- Positions related to CPAP device could not be evaluated due to inconsistency in chart documentation.

## Discussion

- Projections for Fisher Paykel use suggest larger HC over time as compared to the Hudson.
- Fisher Paykel use contributes to narrow head shape with posterior occipital shift.
- Hudson use projections suggest slower rate of HC change over time.
- Hudson CPAP contributes to superior shift of the cranial bones and flattening of the occiput, allowing HC to stay relatively stable based on typical boney landmarks for HC measures (chart 2).
- HC, and therefore head growth measures, are highly dependent on measurement landmarks used.
- Our study demonstrates that CPAP devices have differing impacts on CI and HC, likely due to design differences and how the device is secured to the infant's head.
- CPAP devices may impact variety of positions used and may impact long term motor development, but further research is needed.



Dolichocephaly