

# PREDICTING PREVENTION:

A RETROSPECTIVE REVIEW OF HIGH-RISK CHILDREN PLACED ON CRIB MATTRESSES DESIGNED TO SUPPORT SKIN INTEGRITY

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## Introduction

Identifying children at risk for skin breakdown has improved as the organization has engaged in national efforts to improve awareness and promote education among all staff. Children are identified either at admission or early in the acute illness phase. As the organization has developed policies aimed at prevention—which addressed support surfaces—there remained a gap in resources. Until recently, the availability of pressure redistribution mattresses for cribs was limited and cost-prohibitive.

With the availability of a pressure redistribution mattress that is custom-built for existing crib frames, the children's organization was able to purchase mattresses for children at risk for pressure ulcers. The pressure redistribution mattresses designed for cribs that are used in the intensive care unit fills the void which has existed in pediatric children's hospitals with respect to children who require a crib and not a bed or an isolette.

## Methods

A retrospective review of charts was done of children who were identified to be in the crib with the pressure redistribution mattress. All children who were identified to be on the mattress during the six-week period were included in the chart review. The chart was reviewed for skin integrity upon admission, prior to discharge, and any documentation of skin breakdown related to resting surface pressure. Variables measured were age, weight, height, length of stay, days on mattress, and hours of intubation as well as pH and temperature while on mattress. Albumin was recorded as variable to factor in as a reflection of nutrition status.

## About the Authors

**Charleen Singh** practices in both the acute care and the community setting working with children at Shriners Hospital for Children and adults in skilled nursing facilities after being the CWOCN at Stanford Children's for the past 8 years. Charleen cofounded the San Jose State Wound Ostomy Program which is the only accredited program in California and enjoys teaching nurses the art and science of Wound Ostomy care.

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## Results

### DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

| VARIABLE                 | N  | PERCENT |
|--------------------------|----|---------|
| <b>GENDER</b>            |    |         |
| Male                     | 10 | 45.5%   |
| Female                   | 12 | 54.5%   |
| <b>ETHNICITY</b>         |    |         |
| Caucasian                | 9  | 41.0%   |
| Hispanic                 | 11 | 50.0%   |
| Other                    | 2  | 09.0%   |
| <b>PRIMARY DIAGNOSIS</b> |    |         |
| Cardiac                  | 6  | 27.3%   |
| ECMO                     | 2  | 09.1%   |
| Sepsis                   | 3  | 13.6%   |
| ENT                      | 2  | 09.1%   |
| Respiratory              | 3  | 13.6%   |
| Neurology                | 2  | 09.1%   |
| Post-Surgical            | 4  | 18.2%   |

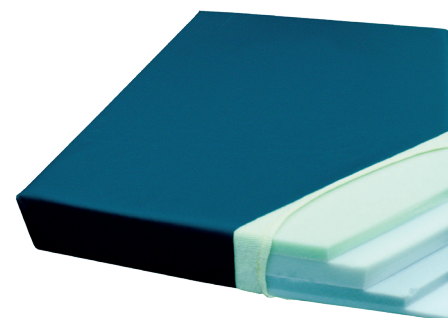
### TREATMENT CHARACTERISTICS

| VARIABLE             | N    | %    | MEAN |
|----------------------|------|------|------|
| <b>Intubation</b>    |      |      |      |
| Yes                  | 17   | 77.3 |      |
| No                   | 5    | 22.7 |      |
| Hours                | 2425 |      | 151  |
| Paralytics           | 16   | 72.7 |      |
| Sedation             | 19   | 86.4 |      |
| Waffle Cushion/Z-flo | 7    | 31.8 |      |

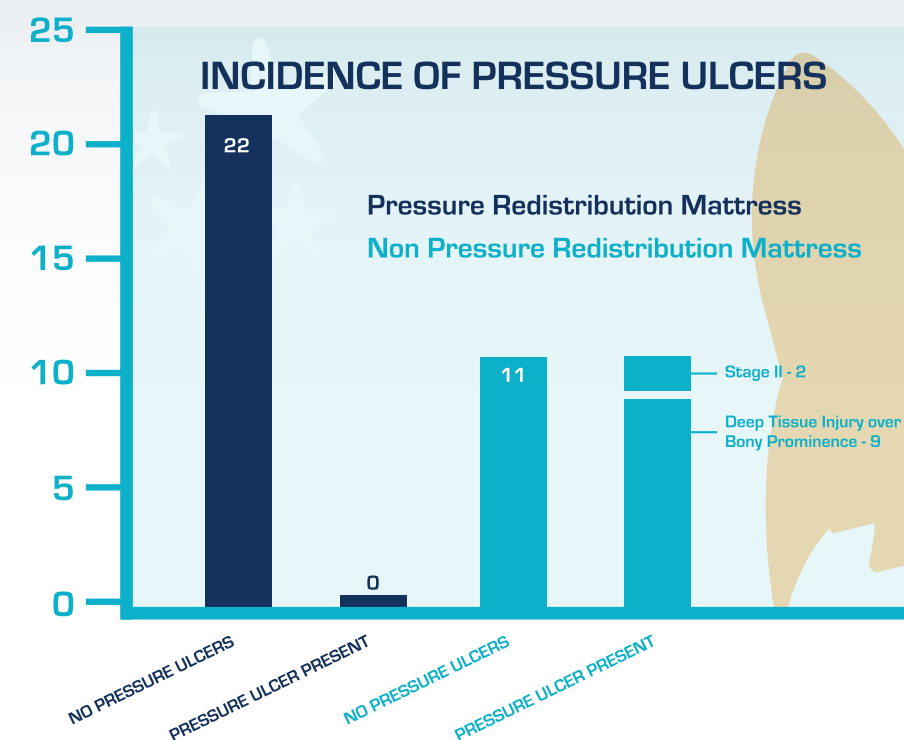
children were less than one year of age and had the longest intubation times. The children at highest risk had Braden scores of 9 and were on Extracorporeal Membrane Oxygenation (ECMO). There were no members of the cohort who were identified with skin breakdown per documentation in the nurses' notes or the providers' discharge exam. In the quarter prior to the mattress trial, there were nine incidences of deep tissue injuries on three different children. The children who had developed pressure ulcers prior to the mattress switch were similar in demographics to the children who were on the new mattresses.

### MEANS AND STANDARD DEVIATIONS OF VARIABLES

| VARIABLE            | MEAN | SD    |
|---------------------|------|-------|
| Age in Months       | 17.7 | 22.0  |
| Length of Stay Days | 36.3 | 50.63 |
| Days on Mattress    | 18.8 | 15.7  |
| Hct                 | 10.2 | 3.8   |
| Hgb                 | 30.5 | 11.3  |
| Arterial pH         | 7.30 | 0.12  |
| CRP                 | 1.5  | 2.3   |
| Albumin             | 3.8  | 0.68  |
| Temperature         | 36.6 | 0.25  |



During the six-week time frame, a total of 22 children were in a crib with a pressure redistribution mattress. All children's charts were included in the chart review. The median age of the cohort was less than one year of age. Fifteen of the



## Conclusion

Despite the limited sample size, the chart review revealed children who were placed on the mattress were at high risk for pressure ulcers. The small sample size encompassed children at the highest risk for skin breakdown related to hemodynamic instability, immobility, and nutrition during ECMO. There were two children who were on ECMO and on the new mattress who maintained skin integrity. In the previous quarter, children of similar size with lesser acuity developed multiple areas of deep tissue injury. The use of a pressure redistribution mattress in high-risk children is another reasonable nursing intervention to maintain skin integrity. A retrospective study with a larger sample size would support evidence-based practice.

**There was a 100 percent reduction in incidence of pressure ulcers when compared to a similar cohort group prior to the mattress conversion.**

**Sizewise**

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