

# In-hospital Neonatal Falls: An Unintended Consequence of Efforts to Improve Breastfeeding

Colleen A. Hughes Driscoll, MD, Nicola Pereira, BA, Richard Lichenstein, MD

In-hospital neonatal falls are increasingly recognized as a postpartum safety risk, with maternal fatigue contributing to these events. Recommendations to support rooming-in may increase success with breastfeeding; however, this practice may also be associated with maternal fatigue. We report a cluster of in-hospital neonatal falls associated with a hospital program to improve breastfeeding, which included rooming-in practices. Metrics related to breastfeeding were prospectively collected by chart audit or patient survey while ongoing efforts to improve breastfeeding occurred (September 2015–August 2017). Falls were identified through the hospital adverse event reporting system from January 2011 to February 2018. Medical records were reviewed to determine factors associated with the falls, including time of event, pain medication administration, hours of life at fall, method of delivery, or other notable factors that may have contributed to the fall event. Three fall events occurred within 1 year of commencing improvement efforts as process and outcome metrics associated with breastfeeding improved. All events were associated with mothers falling asleep while feeding their infant, and all occurred between midnight and 6 AM. Falls occurred from 38.0 to 75.7 hours after birth. No sedating pain medications were administered within 4 hours of any event. In 2 of 3 cases, mothers experienced notable ongoing social stressors. Rooming-in was the most significant change involved in our health care delivery during the programmatic effort to improve breastfeeding. Monitoring for in-hospital neonatal falls may be needed during projects aimed at improving breastfeeding, particularly if rooming-in practices are involved.

In-hospital neonatal falls during the postpartum period pose a safety risk and are commonly associated with fatigued mothers who fall asleep while holding their newborn.<sup>1–4</sup> Historically, newborn care was centered in a nursery environment, which allowed periods of rest and recovery for mothers. Recent efforts to promote breastfeeding by the Baby Friendly Hospital Initiative and the American Academy of Pediatrics have focused on rooming-in care, which

may offer breastfeeding benefits over the more secluded nursery care established in the 20th century.<sup>5–10</sup> However, rooming-in may compromise a mother's opportunity for uninterrupted rest, possibly increasing the risk of neonatal falls.<sup>6,7</sup>

In this series, we review a cluster of neonatal falls temporally associated with policy and practice changes to promote breastfeeding. This represents a reported increase in neonatal falls that began within 1

## abstract



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Dr Hughes Driscoll conceptualized and designed the study, collected and assembled data, and drafted and edited the manuscript; Ms Pereira designed the study, contributed to drafting of the manuscript, edited the manuscript, and reviewed and collected data; and Dr Lichenstein conceptualized and designed the study, supervised data collection and analysis, contributed to the drafting of the manuscript, and critically reviewed the manuscript for important intellectual content; and all authors approved the final manuscript as submitted.

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year of commencing a longitudinal project to improve breastfeeding rates through achievement of the Baby Friendly USA 10 Steps to Successful Breastfeeding (see Supplemental Information).<sup>5</sup> Several Steps (specifically Steps 4, 5, 7, and 8) involved relevant changes in our hospital policies and care delivery that may have impacted maternal fatigue or neonatal falls.<sup>11</sup>

## METHODS

This project was reviewed and exempted by the University of Maryland School of Medicine Institutional Review Board. Cases were identified through the hospital's adverse event reporting system from January 2011 to February 2018. Medical records of identified cases were reviewed to determine injuries sustained and the presence of known risk factors for falls, including delivery type, time of fall event, time from birth to fall event, the administration of pain medication within 4 hours before fall, or other factors that might have contributed to the fall event. Any sustained injuries were recorded. Metrics related to breastfeeding were prospectively collected by chart audit or patient survey while ongoing efforts to improve breastfeeding occurred (September 2015–August 2017). Data included breastfeeding (infants ever breastfed), rooming-in (infants who spent <1 hour out of the mother's room), skin-to-skin contact (infants who were placed skin-to-skin immediately and uninterrupted until after the first breastfeed or at least 1 hour if formula fed), breastfeeding education (mothers who were taught hand expression of breastmilk and cue-based feeding) and the percent of mothers who received assistance with breastfeeding among those who ever nursed. Monthly data were plotted on charts, annotating the relationship between metrics and the fall events. Each monthly data point

represented a sample of 30 chart audits or patient surveys.

## CASES AND METRICS

### Case 1

J.T. was born to a 24-year-old gravida 3, para 1011 mother who was unsuccessful in breastfeeding her first child. The infant was born at 1:45 AM by repeat elective cesarean delivery at term. Breastfeeding was initiated at 4:18 PM on hospital day 1. On hospital day 2, the mother briefly discontinued breastfeeding because of fatigue and discomfort but resumed exclusive breastfeeding with lactation support. On hospital day 4, the mother notified her nurse that she had woken up to her infant crying on the floor, unswaddled. She described breastfeeding the infant and falling asleep. Neonatal examination was normal. Computed tomography (CT) of the head revealed a nondisplaced left parietal bone fracture extending to the anterior fontanelle. The infant was asymptomatic and discharged from the hospital that evening. At 7 weeks old, the infant presented to the emergency department with clinical seizures, confirmed by EEG. Magnetic resonance, CT imaging, and laboratory investigations revealed no signs of infectious, metabolic, or toxic etiology. The patient was discharged on anticonvulsant therapy for posttraumatic seizures associated with previous skull fracture. At 13 months old, the patient was seizure-free, developing normally and discontinued from anticonvulsant therapy.

### Case 2

A.W. was born to a 14-year-old gravida 1, para 0 mother. Maternal history is notable for being in foster care and depression associated with bullying. The infant was born at 11:10 PM by vaginal delivery at term. Breastfeeding was initiated on hospital day 2 at 3:25 AM and

lactation support was provided. Breastfeeding was discontinued at the mother's request. On hospital day 4, the mother reported she had fallen asleep while burping the infant. She was startled by the infant crying on her lap and witnessed the infant fall to the floor. Neonatal examination was notable for a 5 cm crescent-shaped region of erythema on the right temple with 2 small fresh abrasions. Head ultrasound revealed a right frontal soft tissue hematoma. A CT scan confirmed the hematoma overlying the right parietal bone, but no underlying fracture or intracranial hemorrhage was demonstrated. The infant remained asymptomatic and was discharged from the hospital that evening.

### Case 3

P.R. was born to a 26-year-old gravida 3, para 1011 mother. Hospital presentation was notable for ongoing depression with suicidal ideation, triggered by domestic abuse and enslavement. The infant was born at 10:02 AM by cesarean delivery at term. At 7:30 PM, breastfeeding was initiated. On hospital day 2, the mother reported feeling drowsy from her pain medication. Her spouse and a toddler not yet weaned from breastfeeding were present. The infant was brought to the nursery at the mother's request and lactation support continued. On hospital day 3, the mother reported that she was breastfeeding the infant and fell asleep. The infant fell onto the floor, landing on a pillow. Neonatal examination was unremarkable. A CT scan of the head revealed no acute pathology. The infant was asymptomatic and was discharged on hospital day 5.

Table 1 summarizes the fall events. Figures 1–5 illustrate the timing of each neonatal fall event, represented by arrows, and the relationship to improving processes and outcome measures for breastfeeding as they

**TABLE 1** Characteristics of Fall Events

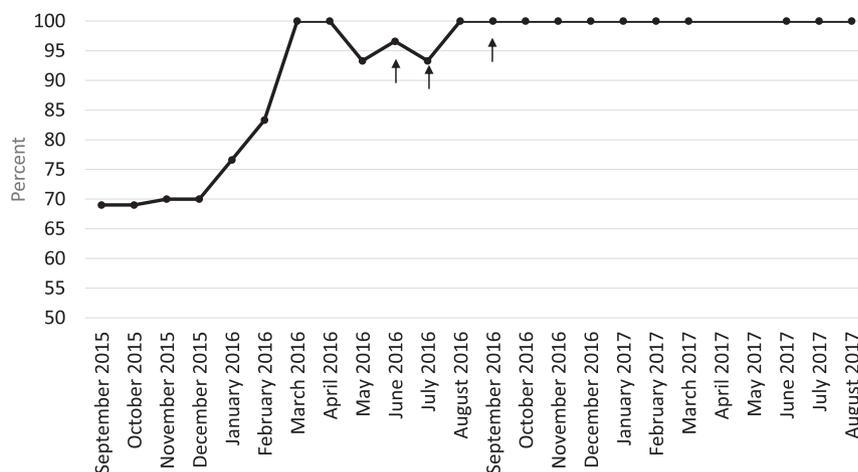
	Time of Day	Newborn Feeding at Time of Fall	Pain Medication Given Within 4 Hours Before Fall	Notable Factors	Hours of Newborn Life
Case 1	5:30 AM	Yes	No	Length of stay >3 d	75.75
Case 2	2:52 AM	Yes	No	Mother <18 y, major depression	51.7
Case 3	12:05 AM	Yes	No	Major depression, toddler breastfeeding during admission, frequent visits from social work	38.05

relate to Steps 4, 5, 7, and 8 of the 10 Steps.

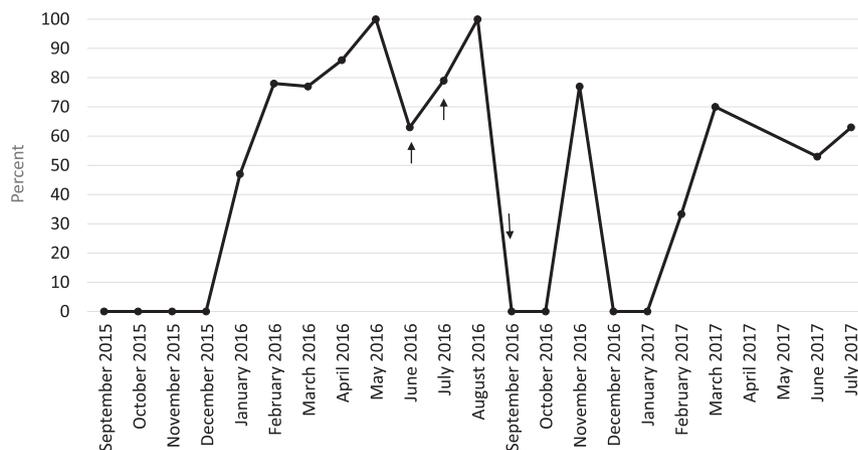
**DISCUSSION**

In-hospital neonatal falls are increasingly recognized as a safety risk during postpartum hospitalizations, with as many as 160 to 1600 newborn falls occurring annually.<sup>3,4,7</sup> Given the number of neonates at risk and the limited availability of data on prevention and management, additional reporting of these falls is deserved. We describe an increase in falls at a single birthing center, commensurate with systematic changes in policy and care delivery intended to facilitate breastfeeding. Although breastfeeding itself likely did not play a direct role in the falls, an emphasis on rooming-in and on-demand feeding may have contributed to maternal fatigue; all of these falls were associated with mothers falling asleep during newborn feeding. The additional emphasis on lactation education, assistance with breastfeeding, and early skin-to-skin support may have further reduced opportunities for maternal rest during the relatively short postpartum hospitalization.

Falls that occur when caregivers fall asleep is a consistent theme in reported series. In a review of patient safety data over a 9-year period, Wallace reported that 150 of 272 neonatal falls occurred after a caregiver fell asleep while holding the newborn.<sup>7</sup> Several smaller series report that 36% to 66% of in-hospital neonatal falls involved caregivers



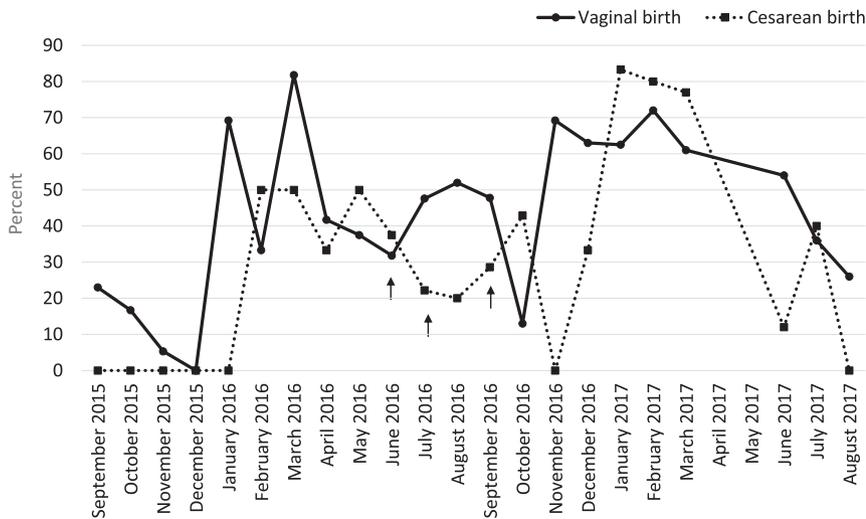
**FIGURE 1** Percent of infants who ever breastfed. Arrows indicate fall events.



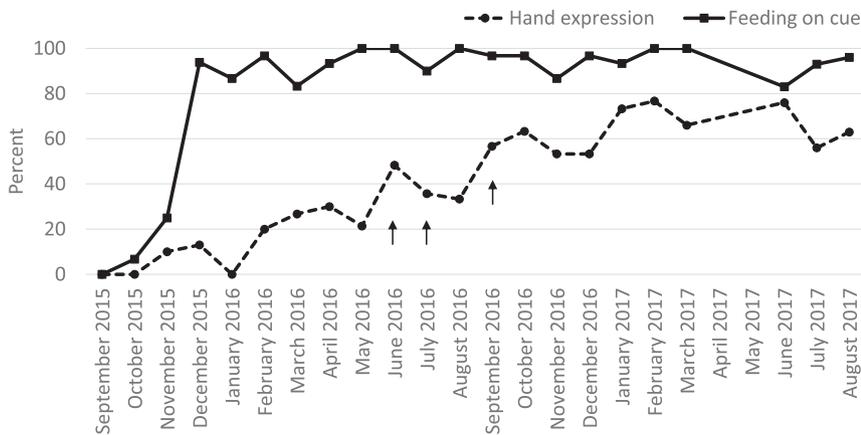
**FIGURE 2** Percent of infants who roomed in. Arrows indicate fall events.

falling asleep.<sup>1,3,4,12</sup> Not surprisingly, these falls transpired most commonly during night or early morning hours. Similar to our series, Galuska<sup>13</sup> described 5 cases at a single center in which all neonates fell from their mothers' arms in the early morning hours, continuing to implicate fatigue as a factor.

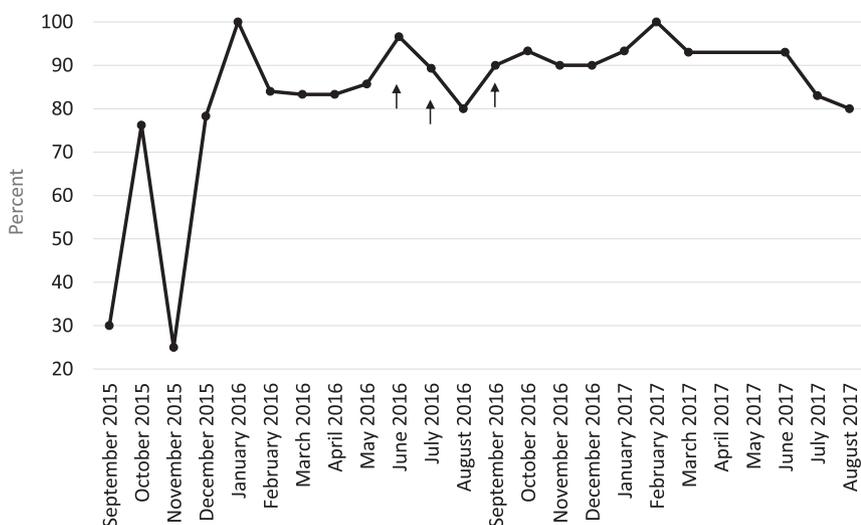
Our case series is the first in which an increase in neonatal falls coincided with improved metrics related to the 10 Steps. Of all the Step targets, rooming-in efforts resulted in our biggest practice change because of the number of clinical workflows and providers affected. Successful rooming-in



**FIGURE 3**  
Percent of infants with skin-to-skin contact. Arrows indicate fall events.



**FIGURE 4**  
Percent of parents who received breastfeeding education. Arrows indicate fall events.



**FIGURE 5**  
Percent of parents who received assistance with breastfeeding. Arrows indicate fall events.

requires extensive collaboration among providers across different specialties to minimize disruptions to maternal sleep. To further support a restful environment, coordination with services such as dietary and environmental services is necessary but may be difficult to achieve. Notably, 2 of our patients (cases 2 and 3) suffered from stressful social situations that may have resulted in more frequent interruptions to sleep by support staff. In case 3, social work visits were required to support the mother while avoiding the presence of a potentially abusive partner. In such situations, the timing of evaluations and treatment may be suboptimal. Thoughtful consideration should also be given to visitation hours during the postpartum period, balancing family centeredness with a restful experience. In case 3, the presence of a toddler in the mother's room likely facilitated family centeredness by encouraging the ongoing breastfeeding of the older child but possibly contributed to maternal fatigue. Given the aforementioned challenges, implementation of rooming-in practices may pose an increased fall risk to newborns. Therefore, we recommend that neonatal falls be considered when working toward improved breastfeeding practices, particularly when rooming-in is a part of the approach. In addition, neonatal fall risk should be emphasized for every patient regardless of feeding type (breast or bottle) because multiple risks of maternal fatigue exist in the postpartum period.

In response to our neonatal falls, we employed a multipronged approach involving patient education, staff education, and changes to our care delivery. To educate parents on the risk of falls, we placed a safe sleep card in each bassinet, modified an existing safety contract, provided more family assistance during nursing, and provided companion

cards that suggested how a father or other support person can assist mothers, especially at night. Staff were provided education on falls with a focus on using clinical judgement to weigh the benefits of rooming-in for each patient on the basis of perceived fatigue and the presence of a support person. Finally, the environment of care delivery was altered by instituting quiet hours to allow for napping, discouraging visitors after 9 PM, and reinforcing the need for frequent nurse rounding on night shift. Similar interventions have been described to assist hospitals with reducing neonatal falls while newborns room in during the postpartum period.<sup>6–8,13,14</sup> Research on the efficacy of these interventions is needed to inform hospitals that promote rooming-in.

## CONCLUSIONS

The majority of in-hospital neonatal falls are associated with caregiver fatigue. Common efforts to promote breastfeeding, such as rooming-in practices, may contribute to fatigue and increase the risk of falls during hospitalization. Surveillance of neonatal falls should be incorporated into projects

aimed at improving breastfeeding outcomes.

## ABBREVIATION

CT: computed tomography

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