

Does Changing Newborn Bath Procedure Alter Newborn Temperatures and Exclusive Breastfeeding?

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ABSTRACT

Purpose: This evidence-based practice project evaluated effects of changing timing/character of initial newborn baths on infant temperatures and breastfeeding status.

Background: The hospital protocol for initial bathing procedures was updated: immersion baths; 12 hours postpartum; family included.

Methods: Staff nurse champions provided staff training. The evaluation included three seven-week periods (2016–2017) and three measures: adherence, temperature stabilization, and exclusive breastfeeding.

Results: Of 1,205 38-week healthy newborns, 322 were born preimplementation (Pre), 486 after (Post), and 397 during maintenance (M). Adherence to bath timing increased and was maintained: 28 percent Pre; 83 percent Post; 85 percent M. Almost 100 percent of newborns had stable temperatures. Breastfeeding exclusivity rates did not change (*ps* greater than or equal to .05): baths less than 12 hours: 79 percent Pre, 74 percent Post, and 68 percent M; baths 12 hours: 68 percent Pre, 71 percent Post, and 73 percent M.

Implications: Changing bath time/character for healthy newborns maintained thermoregulation and exclusive breastfeeding rates. Nurses changed practice quickly, maintaining adherence over time.

Keywords: bath; breastfeeding; newborn; thermoregulation

DURING THE FIRST 24 HOURS A NEWBORN is in the hospital, multiple nursing activities occur and often include a bath. Activities begin with newborn stabilization and initial assessment, initiating maternal bonding and feedings, measuring the newborn, screening for several conditions (e.g., bilirubin levels, hearing), and prophylactic

treatments for eye infection and bleeding. A constant challenge is completing all of these while considering the baby's physiologic state.^{1,2} In 2016, an interprofessional team from Women's Health Services at our 473-bed Magnet hospital evaluated the newborn care protocol and made several changes based upon published standards³; implementation

of the changes related to newborn bathing is addressed in this article.

NORMAL NEWBORN BATHING IN HOSPITALS

An initial bath is commonly done in the first 24 hours of life for hospital-born newborns, although bathing practices vary from setting to setting.^{4,5} The rationale behind bathing is “to remove unwanted soil such as blood and meconium and to leave residual vernix intact.”⁶ Vernix provides antimicrobial, moisturizing, and temperature-stabilizing effects.^{7,8} Because human immunodeficiency virus (HIV) and hepatitis B virus can be found in amniotic fluid, there was a time when provider exposure to these viruses was a concern in terms of newborn care. Bathing babies and having providers use latex gloves was thought to decrease the risk of exposure to these infectious agents for both babies and care providers.^{9,10} Studies were done to determine *how soon after delivery* initial bathing could be safely done. Meanwhile, screening for maternal exposure to these viruses has become standard care, minimizing fear of exposure from infected newborns to providers. Ideally, timing of the first bath is determined by newborn condition as well as the impact of practices such as skin-to-skin time, breastfeeding initiation, and early maternal/family bonding. In fact, the World Health Organization (WHO)³ recommends delayed bathing (24 hours after birth), which may not be possible because of cultural reasons; when done earlier, WHO recommends delays for at least six hours. Lund, in an integrative review,⁵ reports that while healthy newborns can be safely bathed as early as one hour postdelivery, the optimal timing for baths is not clear, and that cultural considerations may impact local practices.

Thermoregulatory Considerations

Effects of bathing on newborn temperatures vary depending upon newborn condition, type of bath, and timing. Newborn skin is thinner than that of adults (epidermis 20 percent and stratum corneum 30 percent thinner), leading to enhanced permeability and potential loss of fluid and heat.¹¹ Always under consideration is maintaining newborn temperature since heat loss accompanies many care procedures. Newborns have reduced thermoregulatory capacity and lose heat via convection, conduction, evaporation, and radiation.¹ Normal axillary temperature for newborns ranges between 97.2° and 99.9°F. Lowering body temperature even by 1.8°F (1°C) can be clinically significant with notable behavioral changes.¹² Such changes can contribute to impaired breastfeeding behavior as hypothermic newborns mobilize metabolic resources to reestablish temperature homeostasis.¹

Beginning at delivery, nursing interventions should aim to minimize heat loss by preventing cold stress, promoting a thermally neutral environment, and evaluating for hypothermia. Strategies used to prevent cold stress include ensuring warm environmental temperatures, avoiding drafts, using skin-to-skin care or swaddling newborns with blankets, not

placing newborns on nonpadded surfaces, and drying babies with warmed towels. Clustering care activities—if tolerated by newborns—is another method that may minimize heat loss and temperature alterations.¹ Well-newborn care strategies that extend periods of skin-to-skin contact include delays in initial bath times.¹³

Sponge Versus Tub Bathing

Tub or immersion baths may lead to less temperature loss in newborns than sponge baths, although differences may not be clinically meaningful. Kuller,⁶ in an evidence review on newborn bathing, posits that use of tub immersion with water covering the shoulders is better for babies than immersion with less water coverage, and better than sponge or cloth bathing. She notes that immersion can lead to calm states in newborns. In a randomized controlled trial with 102 healthy newborns,¹⁴ babies who received tub baths by trained nurses experienced on average 0.36°F less temperature loss than did those receiving sponge baths. Timing of initial baths ranged from 2 to 24 hours after birth. Following standard bath protocols, babies were wrapped in a towel, patted dry, dressed without hats, and swaddled in nonwarmed receiving blankets.

Bath Timing

Timing of initial baths for hospital-delivered newborns varies from setting to setting, and care practices have changed over time. Studies evaluating the effects of bath timing on healthy newborns indicate that baths given during the first 24 hours probably do not negatively impact thermoregulation and delayed baths (12 hours after birth) may enhance breastfeeding rates.⁵

In two studies with similar methodology,^{9,10} no significant differences in rectal temperatures were found between newborns bathed immediately following admission assessments and those bathed four to six hours afterward. The standard bathing protocol included postbath covering with a shirt, disposable diaper, and knit bonnet; babies were swaddled in two warmed blankets. Of interest from the Penny-MacGillivray study¹⁰ was that the mean degree of change in temperature before and immediately after bathing was significant (0.49°F for babies bathed immediately; 0.14°F for those bathed 4 after four or more hours); however, differences became nonsignificant by one hour.

In another randomized clinical trial,¹⁵ no differences were found between postbath temperatures of healthy full-term newborns with an axillary temperature of at least 98.2°F at one hour postdelivery versus two hours. A standard bathing protocol under a warmer was used; babies were clothed in long-sleeved T-shirt, diaper, and swaddled in blankets. In a randomized clinical trial in Japan,¹⁶ babies bathed immediately after delivery were immediately significantly warmer (at ~20 minutes, average 0.54°F difference in rectal temperatures) but not significantly warmer at 1, 2, 3, 8, and 12 hours after the bath. At 12 hours, temperatures in both groups averaged 99.1°F.

In an evaluation of a bath procedure change to delay healthy newborn baths to 12 hours,¹³ in-hospital exclusive breastfeeding rates increased significantly from 32.7 to 40.2 percent. The procedure change involved delaying baths until ~12 hours after birth (compared to two to three hours after) and having parents assist with baths. For six months before and after the procedure change, data on 714 newborn/mother pairs were compared. Before, newborns were bathed on average at 2.4 hours; afterward, baths occurred on average at 13.5 hours. Newborns born after the procedure change were 166 percent more likely to have breastfeeding initiated and 39 percent more likely to be exclusively breastfed than were newborns born before the change.

Other Bath-Related Procedures

Temperature regulation can be promoted by practices such as swaddling and skin-to-skin contact of newborn to mother. In one study,⁴ newborns whose temperature stabilized at or above 97.5°F received the first bath (“typically” during the first 24 hours after birth) and then, while still unclothed, they were placed on their mothers’ bare chests (skin-to-skin). Five of 96 newborns receiving skin-to-skin care had temperatures lower than 97.5°F at 30 and 60 minutes postbath;

they received treatment with a radiant warmer. All but one of these cases was thought to be caused by altered newborn position during the skin-to-skin experience. Unanticipated in this study was that 21 of the 96 newborns breastfed during the postbath skin-to-skin experience, a practice that may further enhance thermoregulation because breastfeeding raises the temperature of the breast, which would enhance the thermoregulatory properties of the skin-to-skin practice.¹⁷

FRAMEWORK

Using the Iowa Model of Evidence-Based Practice,¹⁸ we approached the practice changes for newborn bathing systematically. Now with a new revision,¹⁹ this model identifies three key decision points to be addressed during this process: (a) Is the clinical problem or trigger considered an institutional priority? (b) Does existing evidence support a practice change? (c) Does implementation of the change lead to desired outcomes (e.g., patient, staff, or organizational)? A diagrammatic portrayal of our process is seen in Figure 1, where these decision points are enclosed inside the orange diamonds.

During the protocol review by the interdisciplinary team, updated newborn bathing practices were suggested and

FIGURE 1 ■ Process used to implement newborn bathing protocol changes on mother–baby unit.

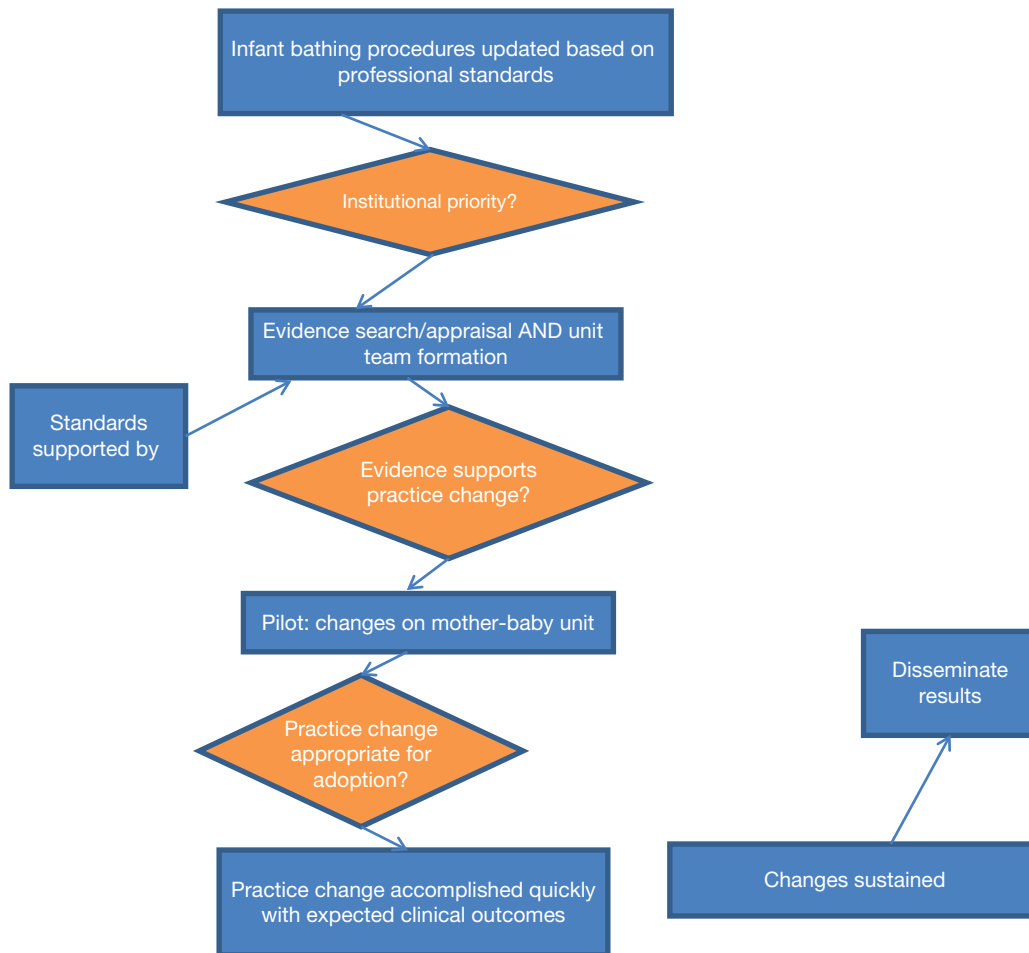


TABLE 1 ■ Change in Bath Procedure

Rationale for Change	Old Procedure Instructions	New Procedure Instructions
Timing of initial bath delayed to ensure newborn is stable before adding additional stressors.	Complete bath within first 12 h of life and when vital signs are stable. If infant is 35–37 wks, may require delay in bath for several hours.	Delay newborn bath for at least 12 h (or longer if requested by parents) or as indicated for late preterm infant, unstable vital signs, and/or glucose monitoring. Timing of immersion bath should be planned to facilitate family education. Exceptions: newborns of mothers who are: <ol style="list-style-type: none"> 1. HIV positive: should be bathed before skin-to-skin contact initiated. 2. Hepatitis B or C positive: should be bathed after first hour of skin-to-skin contact with mother.

Abbreviation: HIV = human immunodeficiency virus.

administratively approved as important for clinical care. Following an evidence review by a nursing project team, these practice changes were incorporated into the new protocol, which went through appropriate hospital approval processes. Volunteer nurse champions were solicited to lead the implementation process; a data analyst and nurse researcher helped with the evaluation plan and collection of baseline and follow-up data on clinical and process indicators.

METHODS

This evidence-based practice (EBP) project aimed to evaluate the effect of a procedure change on newborn temperature and on pre-discharge exclusive breastfeeding rates. No effect on temperature was anticipated, and the effects on exclusive breastfeeding rates were unknown. This project was judged to have exempt status by the health system institutional review board.

Sample

Per the hospital newborn care protocol, newborns had gestational ages ≥ 38 weeks and no known exposure to HIV and hepatitis B in utero. Excluded were newborns where emergent conditions in delivery required medical intervention after initial stabilizing care or where acute decompensation of the newborn's condition occurred.

Intervention

As shown in Table 1, the revised clinical protocol instructed staff to delay the initial newborn bath for 12 hours, and directed a planned “immersion” bath, which is new to the protocol. Staff members were instructed about the change over a two-week period in June 2016 using staff nurse champions, unit flyers, and announcements at staff meetings (see Table 2 for strategies used). Emphasis was made on (a) timing of the bath, (b) doing an immersion bath without vernix removal, and (c) using bath time to help parents bond with baby (which may entail having the mother or father do the bath with assistance).

The education included the following:

- A unit presentation board calling out the change: baths will be done after 12 hours
- Points to make during family/parent education about newborn bathing
- Information sharing during shift change to all nurses briefly giving evidence to support the practice change, photos of bath immersion, and rationale behind suggested changes.

The nurse champions (two new graduates, one new nurse) also reported to others that no evidence supported problems with getting the electronic newborn security anklet wet; manufacturer information on the anklet's waterproof design was

TABLE 2 ■ Implementation Strategies Used for Protocol Change

Strategy	Explanation
Educational poster for staff	A large poster was placed in the nursing break room. All staff members were required to review the information provided and sign off that they had read it. The poster included a table of evidence, explanation of requirements and exemptions for postponing baths to 12 h, pictures on how to perform tub/immersion baths, and copies of educational flyers for parents.
Nurse champions	Three nurse champions developed the educational materials and spread information about the policy change. They also answered questions posed by staff. In the days just before protocol implementation, nurse champions used the first five min at the start of each nursing shift (Focus on 5) to explain specific changes expected and reiterated the start date.
Portable bath tub	A portable bath tub was purchased in case any of the tubs in patient rooms had mechanical issues or unsuitable water temperatures. The portable tub was also used on the overflow unit, which did not have baby-safe sinks. This portable tub was placed on a wheeled cart and could be filled with warm water and pushed into patient rooms. After baths, the tub would be wiped down and disinfected.
Focus on 5 staff education	At the start of day/night nursing shifts, the first five min (Focus on 5) is the time when charge nurses discuss hospital updates or unit changes. During this time, nurse champions discussed protocol changes and the start date.
Educational flyer for parents	All patients admitted to labor and delivery were given an informational flyer about bath procedures. This flyer covered bath timing and health benefits of leaving vernix (white waxy coating that babies are born with) intact for at least 12 h.
White board in patient room updated	In patient rooms, a white board check list shows all tasks to be completed on newborn before discharge. Next to the section for newborn bath, a new sticker was added to say “>12 h.” This way when new families were oriented to the room, nurses could remind parents that the bath would happen after the first 12 h.

included on the unit presentation board. All information was shared over ten days and nurses were expected to incorporate the practice changes into care delivery by a specific date.

Timeline

Time periods evaluated were seven weeks before the change occurred (June 26–August 13, 2016; during the last two weeks of this period, staff education occurred), the next seven consecutive weeks (August 14–September 30), and a final seven-week maintenance period after three months of full implementation (January 1–February 18, 2017). This allowed comparison of preprotocol or baseline status, immediately after the protocol change training ended, and maintenance status.

MEASURES

Timing of Initial Newborn Bath

Timing of the initial bath (<12 hours; ≥12 hours) was used to evaluate adherence to the new protocol (percent of infants bathed 12 hours after birth).

Changes in Temperature

Differences between last prebath temperatures and immediate postbath temperatures were calculated. Per the procedure, axillary temperatures were taken every 30 minutes four times after delivery and then, every six hours. With hypothermia defined as <97.2°F, normothermia as 97.2°–100.4°F, and hyperthermia as ≥100.4°F, differences were categorized as follows:

- No change in nonnormothermia: from hyperthermia to hyperthermia or from hypothermia to hypothermia
- Destabilization: from normal temperature prebathing to hyperthermia or hypothermia

- Stabilization: from nonnormal temperature prebathing to normothermia

Breastfeeding Exclusivity

Breastfeeding exclusivity is defined as “having received no formula, water, or glucose water during the birth hospitalization.”^{13(p487)} Thus, newborns who received at least one formula feed, even for a medical indication, were not considered exclusively breastfed. This evaluation determined whether an infant was being exclusively breastfed upon discharge (yes/no).

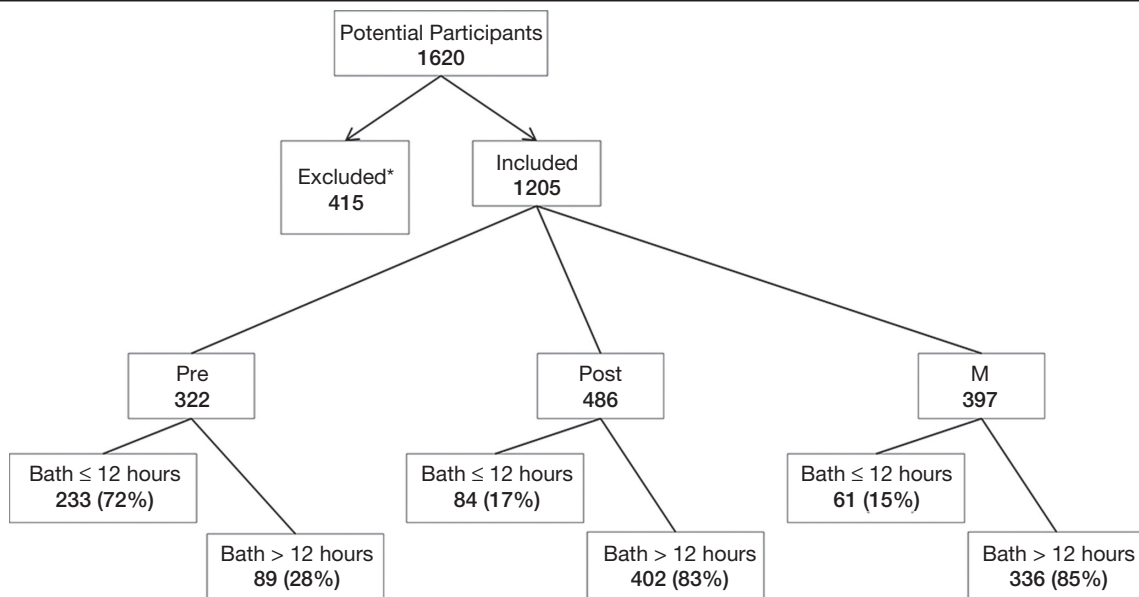
Procedures

Newborns were cared for per the protocol. The hospital standard of care is that newborns room-in with mothers in private rooms. Skin-to-skin contact is encouraged between all baby–mother pairs when not prohibited by health issues. Newborn baths take place in private rooms and are done by either nursing staff, by parents, or by parents with help of nursing staff. The training and revised procedure urges planning “to facilitate family education,” which may have increased parental involvement with bathing.

RESULTS

As seen in Figure 2, of 1,620 newborns born between June 26 and September 30, 2016, or between January 1 and February 18 (2017), 1,205 were included in the analysis. The most likely reasons for not being included were missing data in the medical record ($n = 370$) and transfer to neonatal intensive care ($n = 43$). Of newborns included, 322 were born during the preimplementation period (Pre), 486 postimplementation (Post), and 397 during maintenance (M). Before

FIGURE 2 ■ Adherence to 12-hour bath timing.



*Exclusion criteria: expired (1), declined bath (1), NICU (43), and missing data (370).

Abbreviations: Pre = preimplementation; Post = after implementation; M = during maintenance.

analyzing changes in temperature and breastfeeding exclusivity, checks were done to evaluate staff adherence to the bath protocol. Adherence to the 12 hour bath increased from 28 percent of baths (Pre) to 83 percent (Post) and 85 percent (M). Change in bath timing did not alter percentages of babies who had altered temperatures; almost 100 percent of newborns had stable temperatures following their initial baths.

Of the 1,622 newborns, 139 received medically indicated formula and were not evaluated for potential exclusive breastfeeding. About three-quarters of infants (72 to 76 percent) were exclusively breastfed. No significant effects on exclusive breastfeeding upon discharge occurred based upon bath timing (proportions of infants who received baths 12 or fewer hours and 12 hours were compared at each time point using chi-squared analyses, p 's $\geq .05$):

- ≤ 12 hours: 79 percent of infants were exclusively breastfed during the Pre period, compared with 74 percent Post and 68 M.
- 12 hours: 68 percent of infants were exclusively breastfed during the Pre period, compared with 71 percent Post, and 73 M.

DISCUSSION

This EBP project showed that relatively new nurses can serve as practice change champions, and that practice can change quickly when staff is offered appropriate training and encouragement. One of the important factors to consider when making practice changes is the local context of the work setting.²⁰ The nurse champions working on this project keyed in on knowledge of their fellow staff members to market the infant bath change successfully, allowing nurses and nursing assistants to quickly alter their practice with infant baths. All training efforts emphasized the scientific evidence behind the change. Our evaluation used an exact time point of 12 hours as indicating adherence to timing for the new bath protocol. Preer and colleagues¹³ were more liberal, allowing “approximately” 12 hours. When we reevaluated, allowing for 10 hours postpartum, our adherence increased to 93.2 percent on time baths Post and 90.1 percent M. This reevaluation seems appropriate since nurses told us they often bathed babies a bit earlier than 12 hours due to their desire to bathe an infant before shift change, with an expected upcoming planned visitor, and other reasonable explanations.

Findings of the project supported previous evidence^{6,10,12–15,21} that changing the bathing protocol to 12 hours with immersion did not lead to altered infant thermoregulation. They also showed that these changes did not change the already high exclusive breastfeeding rates upon newborn discharge.

In the United States, initiation rates for exclusive breastfeeding average 70 percent.²² Overall rates in this hospital average 92 percent, with 70 percent for exclusive breastfeeding upon discharge (last one-year period).

These contrast with the lower rates reported by Preer and colleagues¹³: from 32.7 to 40.2 percent following delayed infant baths. At our Baby-Friendly hospital, evidence-based interventions²² known to enhance these rates were already in place (e.g., written breastfeeding policy, staff training in breastfeeding support, policies for implementing breastfeeding support groups, encouragement of rooming-in, restricted/delayed pacifier use, maintenance of skin-to-skin contact between mothers and infants after birth, and encouragement of early breastfeeding initiation). The bath procedure changes may have enhanced maintenance of skin-to-skin contact among some mother–infant couplets, but this did not significantly affect the exclusive breastfeeding rates.

Changing the bathing protocol has had a substantial impact upon the nurses involved and upon the reported satisfaction of parents who were involved in baths. After being reminded of the positive impact that vernix has on newborn skin, some nurses reported more satisfaction knowing that they were postponing the bath and not scrubbing as with previous sponge bathing; they liked knowing that this allowed vernix to provide antimicrobial, moisturizing, pH-balancing, and temperature-stabilizing benefits. Additionally, staff reported that waiting for 12 hours postpartum allowed them to gain more rapport with parents; parents seemed more at ease and receptive to education, and some were eager to participate in bathing. Also noted by nursing staff was that demonstrating the tub bath allowed for enhanced education about safe infant bathing. It was an added benefit that nurses were able to demonstrate a safe bath, and have parents participate in an activity that can be intimidating for first-time parents.

While this study did not measure the satisfaction of parents, and perhaps this would be an interesting idea for further studies, multiple positive anecdotes were affirming for those involved in the change. One specific parental comment was that this tub bath was so much more enjoyable for the parents, because their baby was much more content and calm than was their last baby who had a sponge bath shortly after birth.

CONCLUSION

What we learned from this project was that through education and encouragement, we could successfully implement a major policy change related to infant bathing in a two-week period with no major negative sequelae.

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