TESTING THE FEASIBILITY OF SKYPE AND FACETIME UPDATES WITH PARENTS IN THE NEONATAL INTENSIVE CARE UNIT

By Elizabeth Gingell Epstein, RN, PhD, Jessica Sherman, RN, FNP-BC, Amy Blackman, BSN, CCRC, and Robert A. Sinkin, MD, MPH

Background Effective provider-parent relationships are essential during critical illness when treatment decisions are complex, the environment is crowded and unfamiliar, and outcomes are uncertain.

Objectives To evaluate the feasibility of daily Skype or FaceTime updates with parents of patients in the neonatal intensive care unit (NICU) and to assess the intervention’s potential for improving parent-provider relationships.

Methods A pre/post mixed-methods approach was used. NICU parent participants received daily Skype or FaceTime updates for 5 days and completed demographic and feasibility surveys. Parents also completed Penticuff’s Parents’ Understanding survey before and after the intervention. Nurses and physicians completed feasibility surveys after each update.

Results Twenty-six parents were enrolled and 15 completed the study. More than 90% of providers and parents perceived the intervention to be reliable and easy to use, and about 80% of parents and providers rated video and audio quality as either excellent or good. Frozen screens and missed updates due to scheduling problems were challenges. Two of the 4 subscores on the Parents’ Understanding survey improved significantly. Qualitative data favor the intervention as meaningful for parents.

Conclusions Real-time videoconferencing via Skype or FaceTime is feasible for providing updates for parents when they cannot be present in the NICU and can be used to include parents in bedside rounds. Videoconferencing updates may improve relationships between parents and the health care team. (American Journal of Critical Care. 2015;24:290-296)
Family-centered care (FCC) has been recognized as an important approach to health care quality for decades. In pediatrics, the focus of FCC is to build trusting relationships between parents and the health care team by using 9 core principles (eg, inclusion of families in decisions about treatment and care, flexibility with rules or practices in order to help families with particular needs or values, and sharing honest information on an ongoing basis in ways that families find useful). Although FCC is a vital component in providing high-quality care, implementation of the FCC model in clinical practice presents a challenge to health care professionals. FCC requires broad-reaching buy-in from all members of the health care team and the health care institution that may require changes in institutional design and policy. The multiconceptual nature (communication, respect, collaboration, and empowerment), consequent lack of accurate measures, and lack of direct financial reimbursement for FCC-related activities are additional barriers. Despite these challenges, family inclusion in the whole of pediatric patient care is a worthy goal, and an attainable one with multiprofessional and institutional commitment.

There is some concern that the FCC model promotes information sharing to the point that the burden of decision making is placed squarely on the shoulders of family members in the name of respect for autonomy. However, as noted by Kon et al, family members’ desires and abilities to be involved in decision making vary greatly along a “shared decision-making continuum” that ranges from physician-driven to patient/family-driven decision making. If applied as originally intended, FCC allows providers and patients’ families to find the most appropriate balance of decisional authority by using an individualized and collaborative approach to care and planning. To apply FCC in this way requires, at its root, an effective relationship between health care providers and patients’ families.

Recent studies suggest that building effective provider-parent relationships improves parents’ well-being, honest communication, and collaborative decision making. Parents of hospitalized children desire to see familiar faces, be provided with honest information, be included as part of the team, and trust what is being communicated. Inconsistent caregivers, poor communication, and mistrust can contribute to conflict between providers and patients’ families and to regret. However, provider continuity is unrealistic in intensive care settings because of the involvement of multiple professions and the 24/7 nature of the work. Good relationships between providers and patients’ parents are essential during critical illness, when treatment decisions are complex, the environment is chaotic and unfamiliar, and outcomes are uncertain. Hence, some rethinking about how to build relationships between providers and patients’ parents is necessary, given the multiple shifts, rotations, and specialty services involved in care of patients in the neonatal intensive care unit (NICU).

Internet technologies may help strengthen relationships between patients’ parents and health care providers within the environmental constraints of the unit. Such technologies are increasingly used as interventions to address health problems such as self-management of chronic disease, counseling children with traumatic brain injury, and binge eating among teens. In the NICU, several webcam programs are currently available, such as NICView and Angel Eye at the University of Arkansas. Another program (BabyCareLink) at the Beth Israel Deaconess Medical Center allows parents to view their infant and also provides informational and emotional support by using resources such as an online library and links to external resources. Although these programs have demonstrated benefits, none of these programs offers the ability to interact in

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review board, and all participants provided informed consent.

**Site and Sample**

Parents were recruited from a 45-bed NICU at the University of Virginia Health System. This center serves as a regional referral center, and approximately 50% of NICU admissions are from counties outside the immediate vicinity. Parents were eligible to participate if they were more than 15 years old, spoke English, had a home computer or cell phone with Internet access, and if their infant was expected to stay in the NICU for at least 7 days beyond the day of recruitment.

**Intervention**

At the outset, we consulted expert members of the telemedicine department regarding the use of non–HIPAA-compliant technologies with parents. Their guidance led to a careful crafting of the consent form and enrollment procedures. All parents enrolled in the study were informed that neither Skype nor FaceTime are HIPAA compliant and that their privacy, therefore, could not be guaranteed. Additionally, in-service training for nurses and physicians emphasized the importance of confidentiality with regard to camera placement and voice volume.

The intervention provided parents with brief videoconferencing (Skype or FaceTime) updates from the bedside nurse or treating nurse practitioner or physician once daily for 5 days. Currently, parents receive updates by telephone at their convenience or as needed. The content of the updates was similar to what would be provided by phone (feedings, events of the day, general condition, answer parents’ questions) and were about 3 to 10 minutes in length. Updates were not scripted and no formal protocol was used. Providers used a dedicated password-protected iPad (Apple Corp) for updates. Portable cameras were lent to parents whose computer did not have a camera installed so that providers and parents could see each other. The cameras were returned to the study team at the end of the 5-day intervention.

**Instruments**

Feasibility surveys were developed for parents and providers (parent survey, see Figure). Parents’ demographic data (relationship to infant, race, education, employment) and medical record data (birth weight, gestational age, age on day of enrollment in study, sex, and acuity measures such as mechanical ventilation) were gathered by using surveys derived by the principal investigator. A postintervention open-ended survey invited parents to provide more detailed information about their experience with

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**Methods**

This study used a pre/post mixed-methods approach and was approved by the institutional

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### How reliable was the Internet connection?

- [ ] No connection problems at all
- [ ] Mild connection problems (brief, only on 1 Skype encounter, or easily fixed)
- [ ] Difficult connection problems (prolonged, hard to remedy, or on multiple Skype encounters)

### How was the video quality overall?

- [ ] Excellent
- [ ] Good
- [ ] Fair
- [ ] Poor

### How was the audio quality overall?

- [ ] Excellent
- [ ] Good
- [ ] Fair
- [ ] Poor

If you encountered a problem, what type of problem was it (describe all the problems you had)?
Skype or FaceTime, the content of their updates, and any further comments they had about the intervention. The Parents’ Understanding of Their Baby’s Care and Outcomes in the NICU survey (henceforth called the Parents’ Understanding survey) was completed before and after the intervention.

This survey is a 45-item Likert-style instrument with 4 subsections that is used to assess parents’ broad views of having an infant in the NICU (eg, “I feel fully informed about my baby’s condition and prognosis”), specific parent experiences (eg, “In the last week, how often did you give suggestions about your baby’s care to the nurses?”), problems encountered by premature infants (eg, breathing problems, jaundice, weight gain), the degree to which the parent worried about these problems, and concerns about problems after discharge. Scores for each section are a simple sum of responses within that section, and the total score is the sum of all subscores. A previous study suggested good reliability for all sections (Cronbach α, 0.62-0.96).

Procedure and Measures

Before enrollment, all aspects of the study were described to potential parent participants, including the use of non-HIPAA-compliant videoconferencing technology and the resultant potential for breach of privacy. Upon providing written informed consent, parents completed a demographic questionnaire, a brief open-ended survey, and the Parents’ Understanding survey. When necessary, parents were given instructions on how to download and use Skype or FaceTime to interface with NICU staff. Each day, prior to their scheduled update, parents called the bedside nurse to arrange an exact time for the update. Parents initiated each call in order to ensure privacy. Parent participants were instructed that others (eg, grandparents, siblings) were welcome to watch, but they (the parent) must be present.

Providers were instructed to have the camera initially on them so that they could introduce themselves to the parent, giving the parent and provider an opportunity to see each other face-to-face. Following this introduction, the camera could be shifted to focus on the infant for the remainder of the update. At the end of each update, the provider completed a feasibility survey. In addition, parents completed a feasibility survey, a brief open-ended survey, and the Parents’ Understanding survey after the 5-day intervention had been completed.

Data Analysis

Quantitative data were analyzed by using SPSS v21 (SPSS Inc) after being cleaned and verified. Qualitative data were analyzed by using content analysis. The primary aim, to determine whether real-time videoconferencing is feasible in the NICU, was evaluated by using both quantitative (feasibility surveys) and qualitative data. The exploratory aim was evaluated with descriptive statistics of the Parents’ Understanding survey and repeated-measures t tests to determine whether the parent’s understanding of their infant’s condition changed over the time of the intervention.

Results

During the study period, 26 parents of 25 infants were enrolled. Most (80%) of the parents were mothers, 80% were white (12% African American, 8% other), and none were of Hispanic origin. Most infants were premature (22 of 25). Two infants born at term had congenital defects and 1 had sepsis. Although severity of illness was not directly measured, 9 were intubated and 2 were receiving vasopressor support at the time of the study (Table 1). Parents who completed the study and those who did not did not differ significantly on the basis of education, race, relationship (mother/father), infant’s age (day of life on the day of enrollment), or presurvey scores.

Feasibility

Nineteen parents of 19 infants completed at least 2 Skype or FaceTime updates, and 15 completed all the instruments (before and after the intervention), a 57% completion rate. Most (5) of the 7 parents who did not complete all instruments were enrolled early in the study period, when problems with wireless connection reliability, scheduling, and plans for follow-up with parents were encountered. Since resolving these problems, only 2 of 14 parents have not returned their postsurveys.

Several parents declined to enroll in the study for stated reasons of lack of interest, concerns about privacy (1 parent), lack of perceived need, lack of Internet access, and “too much to think about.” Provider feasibility surveys (n = 37) and parent feasibility surveys (n = 15) suggest that using Skype/FaceTime is an acceptable communication modality in the NICU. Most providers (94%) and all parents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Female sex, %</td>
<td>68 (n = 17)</td>
</tr>
<tr>
<td>Birth weight, mean (SD), range, g</td>
<td>1563 (772), 510-3354</td>
</tr>
<tr>
<td>Gestational age, mean (SD), range, weeks</td>
<td>31 (4), 25-39</td>
</tr>
<tr>
<td>Age on day of enrollment, mean (SD), range, days</td>
<td>24 (25), 1-85</td>
</tr>
<tr>
<td>Mechanical ventilation during study, %</td>
<td>36 (n = 9)</td>
</tr>
</tbody>
</table>
Table 2
Differences in Parents’ Understanding survey scores before and after intervention (n = 15)

<table>
<thead>
<tr>
<th>Score</th>
<th>Survey score, mean (SD), range</th>
<th>Before intervention</th>
<th>After intervention</th>
<th>Difference (paired t test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad views of having infant in neonatal intensive care unit (subscore 1)</td>
<td>63.2 (5.8), 51-76</td>
<td>69.1 (5.7), 58-79</td>
<td>t = 4.3, df = 12, P = .001</td>
<td></td>
</tr>
<tr>
<td>Specific parent experiences in last week (subscore 2)</td>
<td>27.6 (2.8), 22-35</td>
<td>29.5 (3.2), 26-35</td>
<td>t = 2.4, df = 12, P = .04</td>
<td></td>
</tr>
<tr>
<td>Presence of problems common to premature infants (subscore 3)</td>
<td>35.4 (13.2), 14-62</td>
<td>30.3 (13.4), 14-52</td>
<td>Not significant</td>
<td></td>
</tr>
<tr>
<td>Degree of parent worry about problems (subscore 4)</td>
<td>18.4 (7.2), 7-35</td>
<td>15.7 (5.9), 8-25</td>
<td>Not significant</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>144.6 (16.6), 117-178</td>
<td>144.4 (18.3), 119-176</td>
<td>Not significant</td>
<td></td>
</tr>
</tbody>
</table>

Ninety percent of providers and parents perceived the intervention to be reliable for updates.

As with any intervention, there were challenges. Technological challenges included mid-update freezing of pictures. This problem was not typically remedied by ending the call and restarting the update. Frozen screens were encountered by 4 parents on at least 1 occasion. For 1 parent, the problem was encountered several days in a row, and no further attempts were made after the third day. The hospital’s information technology staff suggested that the problem was most likely due to the Internet at the parent’s home and not at the hospital and thus is a difficult problem to fix. The problem might be helped if the updates are done with the laptop in the same room as the wireless box. This remedy has been suggested to parents recently, but there have been too few instances of the problem to report whether this solution is acceptable. Other technology-related challenges included parents not being able to download and use Skype for free on their cellphones.

Procedural challenges included missed opportunities for enrollment and lack of staff familiarity with the protocol or with Skype or FaceTime. Enrollment was improved with a research assistant and identification of 2 nursing staff “champions” as well as improved team/staff coordination. The champions are trained to identify potential parent participants, to enroll parents, to monitor the progress of the updates for parents, and to troubleshoot when necessary. The research assistant enrolled parents and monitored the study on a broader scale and collected presurvey and postsurvey data. Familiarity with the study protocol and with the technology itself has improved over time with continued in-service training. NICU newsletter updates, suggestions from staff about how to improve update scheduling, and support from the NICU administration.

Parents’ Understanding
Analysis of the Parents’ Understanding surveys before and after the intervention revealed a clinically and statistically significant result, despite our small sample size (Table 2). Total scores were not significantly different before and after the intervention, but scores on the first and second subscales (parents’ impressions of information sharing, NICU care, relationships with their infants’ doctors and nurses, and satisfaction with care both overall and within the last week) were significantly different. Subscales 3 and 4 addressed parents’ concerns about their infants’ development. These scales were largely targeted for parents of premature infants. Although all but 1 of the infants whose parents
completed the study were premature, scores on these scales did not change significantly.

**Limitations**

This study had several limitations. First, the sample size is small and homogeneous (largely white and well-educated). This intervention may not target parents who cannot afford or do not have access to the Internet. Before starting the study, we surveyed NICU parents (n = 27) regarding access to the Internet and found that 95% had access either via home computer or cellphone. Plans are in place to lend iPhones or iPads (Apple Corp) to parents for the duration of the study and to supply parents with temporary wi-fi cards in order to expand enrollment to include any NICU parent. A second limitation was that our method for tracking the number of updates (reliance on providers to record when updates were done) was inaccurate. An objective measure will be necessary in future studies in order to determine how often updates are actually done. Third, we did not formally track the rationales of parents who declined to participate, although the most common reasons given by parents informally were that parents did not have reliable access to the Internet or were present on the unit enough that an additional update was not needed. A better understanding of parents’ reasons for not participating is certainly necessary and worth consideration in future studies. Finally, with our small sample size, we were unable to discern differences in terms of feasibility, interest in enrollment, or usefulness of videoconference updates based on parents’ race, distance from the hospital, or severity of illness. Future studies are needed to flesh out these differences in order to ensure that interventions such as this reach the populations who can most benefit.

**Discussion**

This pilot study indicates that real-time videoconferencing using publicly accessible tools such as Skype and FaceTime are feasible and acceptable to both parents and providers. In designing the real-time videoconferencing intervention, we initially sought to target parents who lived a long distance from the hospital, as this comprises approximately 50% of our admissions annually. We quickly learned, however, that although many parents lived within easy driving distance of the hospital, they too wanted to participate in the intervention. Thus, study enrollment was broadened to include most parents in the NICU. This turned out to be an important feature of the study because many parents, including those who were able to visit daily, appreciated the opportunity to have an update when they could not be with their infant in the unit.

One recommendation for FCC has been family involvement in bedside rounds.5,37 Although there are certainly pros and cons regarding this,38-41 the logistical challenges are at least eliminated with the availability of real-time videoconferencing. It is no longer necessary for parents to be physically present in the unit in order to participate in rounds.

In a critical care setting like the NICU, strong trusting relationships between families and the health care team are key to providing high-quality appropriate care. Current research suggests that weakness in communication patterns between the health care team and patients’ families persists.42-45 This contributes to a lack of empowerment and confidence about readiness for discharge and provider-family conflict.46,47 FCC practices that promote consistent communication and purposeful interaction between all individuals involved in a patient’s care, such as daily updates with patients’ families via real-time video conferencing, may ultimately be useful in bridging current gaps in FCC. Although there is no substitute for in-person discussion, videoconference interventions may promote involvement of patients’ families in decision making and build effective relationships between patients’ families and the health care team that are essential to high-quality and appropriate care.

**ACKNOWLEDGMENTS**
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**FINANCIAL DISCLOSURES**

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**REFERENCES**


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