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MCH Innovations Database Practice Summary & Implementation Guidance

Reducing the Risk of SIDS and Other Sleep-related Infant Deaths through the Design and Deployment of Free Educational Apps for Mobile Phones

The SIDS Center of New Jersey expanded its educational toolkit for reducing the risk of Sudden Unexpected Infant Death by the development of two free mobile phone apps, SIDS Info and Baby Be Well,[®] to enhance provider, parental, family, and community knowledge of and virtual access to safe infant sleep and other risk lowering information, with the former app adding English and Spanish voice-over to its bilingual text and graphics.



Location

New Jersey



Topic Area

Injury
Prevention/Hospitalization



Setting

Community



Population Focus

Perinatal/Infant
Health



NPM

NPM 5: Safe Sleep



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Section 1: Practice Summary

PRACTICE DESCRIPTION

The SIDS Center of New Jersey (SCNJ) was established in 1988 under a health services grant from the New Jersey Department of Health to Rutgers Robert Wood Johnson Medical School. Its missions throughout its 33 years of operation have been to: provide bereavement support, study etiologies and risk factors of SIDS and other sleep-related infant deaths and develop and provide risk-reducing and preventive educational interventions. Its research has contributed to the Safe Sleep guidelines of the American Academy of Pediatrics (AAP), and in association with its educational interventions and public health collaborations, New Jersey's Sudden Unexpected Infant Death (SUID) rate is among the lowest in the U.S. We use continual data analysis and stakeholder input to identify challenges to knowledge acquisition and the use of infant care practices at community levels and across demographic groups. We address the role of adverse social and health determinants, including implicit bias as well as the role of safe sleep practices in ameliorating risk. These steps led the SCNJ to examine new methods for carrying out a core mission in reducing the risk of SUID: equitable and sustainable communication to providers and the public of safe infant sleep practices.

This examination led to the development of two novel and free mobile phone apps that facilitate access to and sharing of information about safe sleep practices, including under the constraints of COVID-19. Breastfeeding and smoke avoidance messaging is included. It is our goal that these apps will enhance dissemination of a common body of knowledge and facilitate a further decline in rates and in racial disparities. National SUID rates have remained relatively static, black infants remain at greater risk, and disparities remain evident. On behalf of parents and other care givers, the apps are intended to promote access to accurate and comprehensive information across population groups, enhance equitable access to and durability of the material, facilitate content updates, as needed, overcome language and literacy barriers, and promote recurring exposure to information, and thus to reminders, over time. The goals on behalf of providers include convenient access to a standardized script consistent with the American Academy of Pediatrics' safe infant sleep guidelines and a more durable modality than print for sharing information in a cost-effective manner.

The apps we developed provide a free resource with content that will be automatically updated without cost. **SIDS Info**, which was introduced in 2018, and **Baby Be Well ®**, which was introduced at the end of 2019, are free, fully functional, and available to access from the cell phone user's app store. Their features are presented in more detail in Appendix 2. To support programs electing to incorporate the apps, live and on-demand webinars to educate providers in these communities are available for download, without charge, and cover the following topics: Sudden Unexpected Infant Death, social, health, and sleep-related risk factors, the role of antecedent adverse social and health determinants and implicit bias in racial disparities, and methods for sharing information with care givers, including identifying and addressing barriers to receiving information and to compliance. Additional educational resources, such as SCNJ flyers in Section I: Practice Overview Innovation



Station Practice Summary and Implementation Guidance Reducing the Risk of SIDS and Other Sleep-related Infant Deaths through the Design and Deployment of Free Educational Apps for Mobile Phones Emerging Practice Page | 2 other languages and Frequently Asked Questions, are also available to be accessed electronically. These materials create more knowledgeable providers better able to effectively deploy the apps as part of their community's educational initiatives. In summary, the App Education Project provides a fully realized, immediately available and cost-free program that fulfills a basic need underlying the safe sleep mission, the communication of accurate and complete risk reduction information. This project provides an efficient, cost-free, and accessible resource that addresses literacy, language, and fiscal barriers in the communication of this information. (Note: The Logic Model for the program is provided in Appendix 1.)

CORE COMPONENTS & PRACTICE ACTIVITIES

The goal of our program was to add a novel tool to further improve public and provider access to information about safe infant sleep guidelines across race, ethnicity, and age groups. Information about breastfeeding and avoidance of smoke exposure is included. We did this by creating durable and updatable free mobile phone apps that were intended to: be comprehensive in their information, overcome barriers related to language or literacy, encourage return use and thus reminders of safe sleep practices; and be directly accessible to those who did not receive the information through a provider. Due diligence was applied to affirm robust use of cell phones across all demographic groups and common usage by parents for information about infant health and development. It was designed too to be used as a script for providers to use when educating parents in advance of helping families with installation. It was designed to diminish cost requirements associated with print material, to reduce risk that content would be lost or misplaced, and to remain current via automatic updates. The novelty raises community interest. leading to media coverage that brings attention to safe sleep. The specific features of each app have been described in other sections and in Appendix 2. SCNJ already has a comprehensive program of public health education for a broad range of providers, and these webinars and related materials can also be accessed to support new users of the safe sleep app. (see Table 1).

| Core Components & Practice Activities | | |
|---------------------------------------|---|--|
| Core Component | Activities | Operational Details |
| Identifying and informing providers | Identify health, social service, public health, and other systems to inform them about the apps so that they can participate in | Announcements can occur via listservs, e-blasts, and group emails such as those associated with a State chapter of the American Academy of Pediatrics, the American Hospital Association, the Maternal and Child Health Consortia, community service organizations, faith-based institutions, hospitals, |



| | | |
|--|---|---|
| | <p>sharing the information through their networks.</p> | <p>clinics, social service agencies, medical and nursing schools, and programs under the direction of a State's Department of Health and Department of Children and Families. Examples of programs include child protective service offices, community health workers, lactation consultants, childbirth educators, federally qualified health centers, doula programs, childcare and home visitor programs and the EMS system. The content specifies the details of the apps, describes their roles in providing families with safe sleep education. It is assumed that the recipient understands Sudden Unexpected Infant Death and the role of risk-reduction education. If that is not the case, then the email would need to contain additional background information and introduce opportunities for viewing an educational webinar (see #3)</p> |
| <p>Identifying and informing parents and family members directly</p> | <p>Identify media and other modalities by which the public can be made aware of and access the apps independent of any of the systems listed.</p> | <p>In identifying media and organizations to help raise community awareness of the apps, consideration should be given to reaching caregivers across the lifespan, including siblings and grandparents. For example, outreach to older siblings can be achieved via a school-based health education session. Posters can be placed in hair salons and other businesses with a QR code that would allow for easy download. Faith-based community programs encompass the lifespan. Partnering with community-level advisory groups help evolve best practices for informing the public.</p> |
| <p>Educating providers about safe sleep</p> | <p>For those who will use the app to educate families, a more in-depth tutorial on safe infant sleep should be provided. This is especially important if the those who take on this role are not familiar with SUID and risk reduction practices.</p> | <p>Using live webinars and downloadable on-demand webinars, CEU programs can be offered to providers. Knowledge can be supplemented by FAQ lists and electronic material in multiple languages. Examples of webinars and resource material can be accessed via the SIDS Center of New Jersey Facebook page: https://www.facebook.com/SIDSCenterNJ/. Included in various webinars is information about SUID and risk reduction, social and health determinants, implicit bias, and methods for conducting respectful discussions, addressing barriers to compliance. Additional material, including educational booklets, also can be accessed from the NICHD Safe to Sleep Campaign website.</p> |



HEALTH EQUITY

An important goal of the apps was to broaden access to a common, evidence-based body of safe sleep information across the spectrum of racial, ethnic, economic and educational sectors, thus addressing any inequities resulting from provider variability in transmitting this information or caregiver variability in accessing it. One of the first concerns was to determine cell phone availability across race and ethnicity and levels of financial resources. The project went forward only after broad access was confirmed. There are several online data sources that can provide regional information. English and Spanish are the most common languages in the US. Therefore, SIDS Info was developed with both languages represented in text and voice-overs. Additional languages are being added in the form of links in the menu section to flyers created by the SCNJ. As resources become available, we hope to expand the full app to other languages. SUID rates are highest for mothers who did not graduate from high school. Therefore, to overcome any limitations related to literacy, SIDS Info also has voice overs using a maternal and "infant" voice, to add appeal.

In contrast to SIDS Info, the app Baby Be Well® is a more recently developed tool for which language translation and voice-over resources have not yet been identified. However, given the role of the grandparent play, particularly in economically challenged populations at higher risk, one of the data points we will study is whether the unique features of photo and milestone sharing that are featured in this app will attract and sustain the interest of grandparents. The SCNJ continually provides public health community education in multiple forums. From January 2018 to September 2020, the SCNJ gave 153 presentations that reached over 34,000. These presentations give community members and providers information about safe sleep and review supportive resources including the apps. The presentations also describe racial disparities in adverse social and health determinants, such as preterm birth,¹ that produce an infant more vulnerable to SUID. The role of implicit bias is also presented, including data from a Robert Wood Foundation et al. study that 22% of African-Americans surveyed did not seek medical care due to anticipating discrimination. These discussions underscore the need for providers from all programs that interface with parents to engage them in safe sleep education and to raise awareness of the apps.

1. Ostfeld BM, Schwartz-Soicher O, Reichman NE, Teitler JO, Hegyi T. Prematurity and Sudden Unexpected Infant Deaths in the United States. *Pediatrics*. 2017 Jul;140(1):e20163334.

EVIDENCE OF EFFECTIVENESS

Although the program has not yet been formally evaluated, some initial signs of success have been noted. The most important outcome measure is the infant mortality rate. The SIDS Info app became available in 2018. According to New Jersey State Health Assessment Data (NJSHAD), the New Jersey SUID rate for 2018, per 1000 live births, was 0.49, rounded on-line to 0.50. This contrasted with 0.68, rounded on-line to 0.7, for 2017. Thus, there was a decline of 27% in the SUID rate. We also noted a decline from 2017 to 2018 in NJSHAD rates for term infants, for both White and Black non-Hispanic infants of 58% and 28%, respectively. Based on CDC WONDER data from the linked birth/infant death file, New Jersey's SUID rates fall well below the national rate and are in the lowest quartile.



Lower rates have been sustained over time.² For 2018, the New Jersey SUID rate was 3rd lowest, compared to other states.

We implemented a novel school-based health education program in a community at higher risk for SUID. Students demonstrated increased awareness of safe sleep and smoke avoidance in students from 4th to 12th grade.³ In advance of releasing SIDS Info, we identified another school in a high-risk community and evaluated the messaging that would become part of the safe sleep app promoting safe infant sleep. The study was conducted in a high school in an urban city with a predominantly Black non-Hispanic population at higher risk for SUID.⁴ Students were able to sustain high levels of knowledge two months following the education program and were successful in educating community members using the same messaging.

Using virtual platforms to engage a convenience cohort of community and provider groups, we assessed change in knowledge following the app's messaging. There was a 33.8% improvement in knowledge for the presentation in English, with an average post messaging score of 96% and 43.9% improvement in knowledge for the presentation to a Spanish-speaking audience, with an average post-messaging score of 92%. (unpublished data).

While no preliminary information related to Baby Be Well® is yet available to determine if the app resulted in stimulating more return visits at which safe sleep reminders are provided, we previously developed a Keep It Up campaign for pediatricians to address declining compliance over time. The reminders shared by trusted providers resulted in an improvement in compliance in the critical two to four month age group (unpublished data).

2. Erck Lambert AB, Parks SE, Shapiro-Mendoza CK. National and State Trends in Sudden Unexpected Infant Death: 1990-2015. *Pediatrics*. 2018 Mar;141(3):e20173519.

3. Ostfeld BM, Esposito L, Straw D, Burgos J, Hegyi T. An inner-city school-based program to promote early awareness of risk factors for Sudden Infant Death Syndrome. *Journal of Adolescent Health* 2005;37:339-41.

3. Ostfeld BM, Lansang D, Hegyi T. A Student-Based Initiative to Reduce the Risk of Sudden Unexpected Infant Death. *NJ Pediatrics* 2020;45:20-21.

Section 2: Implementation Guidance

STAKEHOLDER EMPOWERMENT & COLLABORATION

Since 1988, the SCNJ has partnered with organizations that share the same public health goals of addressing the social, health and behavioral factors that adversely affect infant health and survival. These stakeholders represent: New Jersey's public health; health, social service and child care providers; home visiting and faith-based communities; public health organizations such as the American Academy of Pediatrics New Jersey Chapter, the New Jersey Hospital Association, the



Maternal and Child Health Consortia; the programs of the New Jersey Department of Health, including the Perinatal Risk Assessment Monitoring System steering committee; the Department of Children and Families, including serving as education resource for the Division of Child Protection and Permanency; the Primary Care Association; Federally Qualified Health Centers; WIC; Centering Pregnancy; first responders; pharmacists; and community-level organizations, such as Children's Futures in Trenton, NJ, at both the leadership and care recipient level.

Through our Seeds of Change program, we also work with faith-based communities. Many of these organizations are represented on the Advisory Board of the SCNJ, along with parent representatives, and we, in turn, participate in their advisory groups and initiatives. SCNJ leadership participates in relevant statewide committees and projects such as the NJ Perinatal Quality Collaborative Health Disparities Work Group, the NJ Department of Children and Families Infant Child Health Committee and the Autopsy Protocol Committee of the Office of the State Medical Examiner. The SIDS Center is also the designated provider of safe sleep education to Healthy Women Health Families providers, Community Health Workers, and Doulas and works with hospital-based pediatric and nursing leadership to provide education for those institutions.

We also work with social justice initiatives. These collaborations bring us into contact with stakeholders from all sectors and professions that affect infant health and safety, including parent representatives. The groups represent diverse skills, diverse racial, ethnics, age, and economic levels. Discussions within programs or in committees with a broad range of representation yield information on challenges. For example, we learn that short hospital stays challenge nurses needing to educate new parents. From parents, we learn that they are overwhelmed with the amount of print material they receive upon discharge, particularly from a neonatal intensive care unit which is disproportionately likely to be the location of discharge, given the higher percentage of preterm infants in SUID. From parents we learn about unintended misinformation or the absence of information. From data, we learn, for example, that compliance with safe sleep declines over time. From many groups we learn about provider turnover and the need to insure continuing education of providers. Once a need has been identified via data analysis, as for example a decline in compliance over time, we identify the stakeholders who would be likely to have knowledge of the needs and of possible solutions. Need is corroborated in this manner. Many initiatives began with this approach. Unrelated to the app, we developed a project involving distribution of baby onesies with back to sleep messaging. The intent here was to help orient parents on the discussion, to help nurses engage on the topic in a positive way, and to reinforce the message after discharge. These needs were identified in discussions with nurses. Similarly, discussions with parents about misplacing print material, with non-medical providers about accessing educational material, and with public health organizations about literacy or about accessing education material in the many languages represented in NJ helped solidify the need for a novel solution in the form of an app. Cost efficiency in producing material is an issue that we recognize as do all organizations receiving grant funding. These challenges were identified in discussions with administrators. As we move forward in conducting studies on implementation, impressions, and impact, these many groups will continue to serve as resources.



REPLICATION

The practice has yet to be replicated.

INTERNAL CAPACITY

The program we are presenting is a fully realized project. Provider orientation/education programs electronic materials related to Sudden Unexpected Infant Death and the role of safe infant sleep practices and the apps are complete, free of charge and available for use. Therefore, the focus of a public health, medical, educational, social service, or community service program choosing to use the apps would be to organize how best to inform providers and the public of these tools and how best to organize educational opportunities, including events where continuing education credits could be earned by providers engaged in dissemination of safe sleep information. Professions involved in such a leadership capacity include but are not limited to health care and social service providers and public health educators. They should be familiar with the work of the Taskforce on SIDS of the American Academy of Pediatrics and the NICHD Safe to Sleep Campaign.

PRACTICE TIMELINE

No practice timeline is provided because the educational material and apps are fully realized and usable without cost. Systems already charged with providing safe sleep education would have personnel already deployed for this purpose. These tools would become resources for those individuals. For organizations such as hospitals seeking to use the information for their systems, start-up would be immediate. For organizations similar to the SIDS Center of New Jersey, with a mandate to provide statewide safe sleep education, we would recommend a three month start up period during which potential recipients would be identified and informed of the resources and any regional provider orientation and education webinars could be scheduled.

PRACTICE COST

No cost guidelines are provided because the educational material and apps are fully realized and usable without cost. Systems already charged with providing safe sleep education would have personnel already deployed for this purpose. These tools would become resources for those individuals.



LESSONS LEARNED

One of the most important lessons learned from this practice is that it is critically important to remain involved with technical support, because technical needs do not end with the deployment of an app. As operational platforms for phones evolve, coding may need to be tweaked. Budgets must take into account these requirements. An example of what we have learned in terms of functionality is that age groups vary in their knowledge of navigating an app. While younger users recognize the universal sign for "menu," older users may not. Operation of the app should be intuitive. Messaging must also be adapted to this technology. Words must be easy to read on a phone screen, meaning that the message must be conveyed efficiently without sacrificing accuracy. One cannot simply transfer a website viewed on a PC screen to that of a cell phone.

In terms of raising awareness of the app, we recognized that in addition to informing providers, we needed to engage in methods that reach the public directly. If the app is a tool that assures direct public access, public awareness is critical. There is no universal approach. Communities vary by how they receive and share information. Examples of our approaches were listed in Table 1. In addition, we will be implementing community level advisory groups and participating in those that already exist in order to evolve best practices for informing the public. No matter how well rated or potentially impactful a tool may be, it serves best only if it is well-deployed.

We also learned that it is important to have technical support available should content need to be updated. For example, when the AAP releases its next version of the Safe Infant Sleep Policy, any changes would need to be reflected in the app's content. Otherwise, the app would have to be discontinued. We also were concerned about how change in messaging would reach users. We did not want to replicate a common problem with print material that out-of-date material might continue to be used. Fortunately, we have learned that once updates are made to an app and uploaded, they automatically change the user's version or notify the user that a new version is available. This is another example of an app's benefits. Users are informed of change, and there is no need to incur the cost of reprinting material. From focus groups we expect to learn more about possible modifications we can make in the graphics, possible interactive tools we can add to sustain interest, and how to improve functionality even more. Cost will always determine what is feasible. Currently SIDS Info, which was released earlier and has features not yet available on Baby Be Well® helped us learn the importance of anticipating future costs. Currently SIDS Info is available in English and Spanish. Changing code to add new translations to text and voice-overs is costly. These additions require new funding. However, until those steps are achieved, we have learned of alternative and cost-efficient ways languages can be added. Specifically, in the menu section, we will be adding a link to print material in other languages such as Haitian-Creole. Overall, cost remains the most challenging factor in app development. For that reason alone, sharing of apps that are already developed becomes an important way for programs to help each other.

NEXT STEPS

We are planning next level efficacy studies to assess knowledge acquisition and retention, behavior change, and app usage by providers and caregivers. This activity will be undertaken first with SIDS



Info. We are exploring plans to add a language to SIDS Info, which currently features English and Spanish. Baby Be Well® is a more recently developed app. We are exploring the costs of adding usage features comparable to those on SIDS Info. Those would consist of adding an iOS version to the existing Android version, translating text into Spanish, creating voice-overs in English and Spanish. We continue to expand methods of raising public and provider awareness of the apps. To date these include messaging through New Jersey's public health listservs, e-blasts, and group emails such as those associated with the American Academy of Pediatrics-New Jersey Chapter, the New Jersey Hospital Association, the Maternal and Child Health Consortia, and the Infant Child Health Committee of the New Jersey Council for Young Children as well as direct e-mails to community service organizations, faith-based institutions, hospitals, clinics, social service agencies, and medical and nursing schools. Programs under the New Jersey's Department of Health and Department of Children and Families also receive mailings. Examples of programs receiving information in that manner include but are not limited to child protective service offices, community health workers, federally qualified health centers, doula programs, child care and home visitor programs.

RESOURCES PROVIDED

- The link <https://www.facebook.com/SIDSCenterNJ/> provides access to the SCNJ's live and on-demand webinars, educational flyers, FAQ list, and the AAP safe sleep policy statement. New resources are continually posted. These resources can be used to provide community education on SUID, risk factors, risk reduction, and the app.

APPENDIX

- **Appendix 1: Logic Model**

The SIDS Center of New Jersey's (SCNJ) Safe Sleep Education Mobile Phone Apps SIDS Info and Baby Be Well®

While a number of theories can be applied to identifying the underpinnings of and steps toward behavior change, we chose the Social Ecological Model (SEM)¹ as best representing an app's potential role and impact. The SEM model also was selected by the Expert Leadership Group of the National Action Partnership to Promote Safe Sleep (MCHB Safe Infant Sleep Systems Integration Project, Georgetown University National Center for Education in MCH), in which the SCNJ was represented. The SEM model covers the multitude of factors and their interactions that contribute to change, from the individual, to the interpersonal, organizational, community and public policy levels.

The ultimate goal of programs addressing Sudden Unexpected Infant Death (SUID) is to reduce its rate. Many factors play a role, from social and health determinants to infant sleep practices. The apps focus on the transmission of knowledge about safe sleep, and also about breastfeeding and



avoidance of smoking. It has been said that a public health policy that is not followed is a failed policy. We believe that the first step to failure is in failure to transmit evidence-based information.

At the **individual** level in the SEM hierarchy, knowledge is core to change. Through learning from trusted sources, individuals are able to recognize that information upon which they have based their actions may be lacking or inaccurate and inconsistent with their goals. Such insight is a first step to change in both the SEM model and change theory. Although studies and public health data document the proliferation of knowledge on safe sleep, these data also identify gaps in the transmission of knowledge and inaccuracies in the information that is transmitted. At the level of the *individual* in the SEM model, the app adheres to the American Academy of Pediatrics evidence-based guidance. It therefore meets the standards providers would use in selecting a tool for distribution. It presents a structured script that is comprehensive in its coverage of risk. There are no barriers to an individual accessing the information because of near universal mobile phone ownership across demographic sectors. Acquiring information via app is now a commonly used and accepted practice and a method used by parents. Concerns about language and literacy have been removed from the SIDS Info app due to the availability of text and voice-overs in English and Spanish. Unlike flyers, a phone is less likely to be lost. Hence, we believe that the goal of creating an accurate and accessible model of information transmission has been achieved. This model also overcomes the logistic and economic challenges programs face in maintaining sufficient print material for their community's needs. Where information is available electronically, hospitals may not have the fiscal or human resources to print out hard copies. Nor do all homes have access to personal computers from which to access this information. The apps also overcome the fiscal challenge presented when updates to guidelines must be made. In those cases, existing print material must be removed and new products issued. There is no simple way of alerting previous recipients of print material or of assuring that programs that transmit information via print have stopped using outdated material. In contrast, changes to text and voice-over can be made to an app and pushed through to existing users automatically or via alerts.

The second SEM level addresses **interpersonal** factors. Social networks and norms are the focus here. The influencers may include friends, family, colleagues, and faith-based communities. These groups comprise a parent's network and can act to normalize or trivialize new knowledge. Families at higher risk for SUID have been found to have more limited networks that may be less likely to model or support current safe sleep practices.² Hence it is important that knowledge reach influencers. The SCNJ has a long history of working with stakeholders and bringing safe sleep knowledge down to the community level. The app has added value because it can be shared remotely with peers and family who were not in the presence of a safe sleep educator and did not receive any print material. Parents can help family and other caregivers download SIDS Info and Baby Be Well® Moreover, with respect to the Baby Be Well® app, a compelling feature is that it serves as a baby book through which photos and milestones can be shared with family members, thus ensuring frequent exposure to the safe sleep information.

The third level is **community**. SIDS Info's capacity in this level is as a unifying entity, something that is shared across community systems and leaders to "institutionalize" a common body of information. This uptake is achieved by the SCNJ's outreach education, an activity that programs interested in using the app could undertake to promote awareness within their community of providers and among



the community of potential users of the apps, using webinars the SCNJ makes available through its public access [Facebook page](#).

The fourth level is **organizational**. Here systems such as schools were of importance in the SCNJ's planning. The apps provide an easily accessed educational technology, one that is cost effective and can be updated. We assessed efficacy of the messaging in one of our school-based studies³ and have been helping programs include information on the app in curricula for trainees in health care, social service, home visiting and other maternal and child health programs. Organizations also include public health, social service and medical systems, and the SCNJ communicates with leadership in these systems to facilitate inclusion of the apps in their training programs.

The fifth level addresses **policy**. Will the app become a standardized method for deploying information? Considerations are that changes to safe sleep guidelines by the American Academy of Pediatrics can be efficiently incorporated. Moreover, as these changes are made, outreach to groups already in possession of the app can be achieved through the automatic update process that goes along with this technology. In contrast, it would not be quite as possible to trace all who received safe sleep knowledge via traditional print material. Nor would the printing of new material be cost efficient. Policies to support access to safe sleep education would therefore be facilitated by the availability of apps.

- *Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. American Journal of Health Promotion, 10, 282-298.*
- *Cornwell B, Yan X, Carlin RF, Fu L, Wang J, Moon RY. Social network influences on new mothers' infant sleep adjustments. Soc Sci Med. 2021; 269113585*
- *Ostfeld BM, Lansing D, Hegyi T. A Student-Based Initiative to Reduce the Risk of Sudden Unexpected Infant Death. NJ Pediatrics, 2020;45:20-21.*



- Appendix 2: Details on the Phone App

Free Mobile Phone Apps on Safe Infant Sleep¹



| | SIDS Info | Baby be Well® |
|----------------------------|--|--|
| Initial date issued | 2018 | 2019 |
| Operating systems | Android and iOS; downloadable from the phone's App store | Android; downloadable from the phone's App store. |
| Cost | Free | Free |
| Languages | English, Spanish | English |
| Voice-overs | English, Spanish | None |
| Links to resources | Yes | Yes |
| Development | SIDS Center of New Jersey and Zyndo | Rutgers University ² , Volunteers of Microsoft, Tata Consultancy |
| Features | Safe sleep guidance in accordance with the American Academy of Pediatrics policy statement (Pediatrics, 2016) presented with graphics and bilingual text and voice-overs to eliminate language and literacy barriers. Importance of breastfeeding and smoke avoidance included. Links to resources. Music available. Scrolling pace is determined by user. Updated, as needed. | Safe sleep guidance in accordance with the American Academy of Pediatrics policy statement (Pediatrics, 2016) presented with graphics and text. . Importance of breastfeeding and smoke avoidance included. User can take a quiz on risk reduction. Tips of the day provided with each viewing of the app. App can be used to upload and share photos and milestones, thus encouraging return visits. Updated as needed. |
| Optimal use | Providers discuss content with parents and then help them download it; for parents, it becomes a continuously available resource to use and share. | Providers seeking to facilitate exposure to reminders of safe sleep practices and parents seeking to provide other caregivers with the same opportunity. |

1. SIDS Info received a Public Health Innovation Award from the New Jersey Department of Health. Both SIDS Info and Baby Be Well® are listed as resources in the NICHD Safe to Sleep Campaign.
2. Baby Be Well® is a registered trademark of Rutgers, The State University of New Jersey.

Note: Apps can be deleted at will by a user.



How A Safe Infant Sleep Mobile Phone App Meets Identified Needs

| Identified Need | Meeting the Need |
|--|--|
| 1) Need to have all topics on safe sleep covered; | 1) Fully covers safe sleep topics as well as addressing breastfeeding and avoidance of smoke exposure; |
| 2) need to have the same exposure to education for all racial and ethnic groups; | 2) provides delivery of content across all population groups; ownership of cell phone high across all demographics; multi-generational familiarity with apps; |
| 3) need to provide "take home" material that would not be lost or discarded; | 3) it is a more enduring resource less likely to be lost compared to print material; |
| 4) need to have a tool that parents could share with other caregivers who might not have been present for education given to parents; | 4) it can be shared remotely; ownership of cell phone high across all demographics; multi-generational familiarity with apps; |
| 5) need overcome literacy challenges; | 5) unlike print, SIDS Info provides voice-overs; |
| 6) need to have a tool that would give healthcare providers who educate parents a method that ensures consistency of messaging; | 6) SIDS Info serves as a script provider can follow in place of going off-message; |
| 7) need to have a tool that would allow for cost efficient distribution of information and cost efficient updating of content, as necessary; | 7) It can reduce mass printing of material; the updates we make to an app are automatically pushed through to users, in contrast to print material that may continue to be distributed after expiration; |
| 8) need to have a tool to which additional languages can be added as communities diversify; | 8) additional languages can be added as voice over and text; SIDS Info currently has both Spanish and English text and voice-overs; |
| 9) need to have a tool that would stimulate return visits and therefore continued exposure to the messaging; | 9) the Baby Be Well® app was designed specifically to increase recurring visits and recurring exposure to the message via tips of the day; |
| 10) need to have a tool that could be accessed directly by the public, independent of a provider. | 10) communities are informed about the apps and how to access them. |

