

1. PROJECT IDENTIFICATION:

Project Title: Education and Sleep Equipment (EASE): The Injury Prevention Learning Collaborative with Pediatricians

Project Number: H17MC25741

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2. NARRATIVE:

PURPOSE OF PROJECT AND RELATIONSHIP TO SSA TITLE V MATERNAL AND CHILD HEALTH (MCH) PROGRAMS:

The Ohio Chapter, American Academy of Pediatrics (Ohio AAP) operated the “Education and Sleep Equipment (EASE): The Injury Prevention Learning Collaborative with Pediatricians” to address infant mortality in Ohio and nationally caused by unsafe sleep environments and other injuries sustained in the first year of life. According to the Ohio Department of Health, Office of Vital Statistics, “unintentional injuries” were the fifth-leading cause of infant death between 2008 and 2010. Of the 200 deaths reported, 164 – or 82% - were suffocations and 68% (111) of the suffocations were sleep-related. While not all causes of infant death are known, and every infant is technically at-risk, factors have been identified that increase risk, including cultural differences, differences in attitudes and beliefs, and different approaches to sleep practices.

However, an Ohio AAP survey of pediatricians conducted in November 2011 found 83.9% of respondents admitted to receiving no training on injury prevention strategies, and only 36.2% of respondents rated their comfort level a nine out of 10 for providing this information to families, yet 87.7% agree or strongly agree that counseling encourages families to practice safer behaviors. Anticipatory guidance about injury prevention has been shown to be associated with improved child and family functioning. Therefore, the Ohio AAP designed and operated the program to empower pediatricians in all settings to recognize potentially risky behaviors for unsafe sleep and injury in families they encounter, and have discussions or provide resources to encourage behavior change to prevent injuries or death from occurring.

This project was funded under the program priority of improving infant safe sleep environments and preventing sleep-related deaths. The project was operated by the Ohio AAP, overseen by medical directors who are members of the Ohio AAP, and participants included AAP

members from not only Ohio but at least ten other state Chapters.

In Ohio, the Title V Administrative Agency is the Division of Family and Community Health Services within the Ohio Department of Health (ODH). The Ohio AAP continues to be regularly engaged with this agency and the broader ODH. The Ohio AAP has also strengthened relationships with a number of other groups to support this project and other safe sleep initiatives, including the Ohio Children's Hospital Association and ODH groups such as the Ohio Collaborative to Prevent Infant Mortality (OCPIM) and the Child Injury Action Group (CIAG).

GOALS AND OBJECTIVES:

The goals established for this project were selected to relate to prevented injuries or mortality for infants in Ohio. The primary goal would be achieved by improving physician knowledge, confidence, and access to resources to discuss safe sleep and injury prevention with families.

Primary Goal: By July 31, 2016, increase by 10-percent the proportion of infants who are placed to sleep on their backs from a baseline of 72-percent by providing data, educational sessions, and resources to those in a position to reach infant caregivers.

Data to determine the goal was obtained from the Ohio PRAMS conducted in 2009-2010; In 2016 Ohio revised data collection from PRAMS to the Ohio Pregnancy Assessment Survey (OPAS), conducted by the Ohio Colleges of Medicine Government Resource Center. Similar to PRAMS, data was collected in OPAS for the indicator "Among New Mothers Whose Baby Was Alive and Living with Them or Still in the Hospital, Percentage and Number Who Placed their Baby on His or Her Back to Sleep." In 2016, OPAS estimated the percentage for this indicator at 82.76% for all of Ohio, meeting the Ohio AAP's stated goal. OPAS stratified data for this indicator shows the lowest race/ethnicity of baby sleeps on back at 77.44% for non-Hispanic black, with the highest (89.58%) for Hispanic.

To achieve improvements in sleep position and decreases in infant mortality, objectives were

set for participating physicians:

Objective 1: Develop an Injury Prevention screening tool for primary care physicians.

This objective was achieved in 2013, and the screening tool was refined and continued to be used through 2018.

Objective 2: Implement Injury Prevention Screening Tool in primary care using a Learning Collaborative Model for Quality Improvement.

This objective was achieved in 2013, and continued through 2018 with physicians participating in QI projects.

Objective 3: Pediatricians and primary care providers who currently discuss safe sleep practices 40% of the time will provide targeted advice and guidance at the newborn, 2-month, and 4-month well child visits 90% of the time.

This objective was achieved in three waves of the QI project between 2013 – 2015.

Objective 4: Parents who use safe sleep practices only 50% of the time or less will increase to 80% by the 4-month well child visit.

This objective was achieved by test-retest of families in Wave 2 of the QI program in 2014.

METHODOLOGY:

Injury Prevention Learning Collaborative Project

37 primary care practices, and over 120 pediatricians, were recruited from the Ohio Chapter, AAP membership database and partners to participate in 3 waves of the IPLC, the online training module, and 2 waves of a project utilizing the Ohio AAP's screening tools and the Safe Environment for Every Kids (SEEK) tool between 2013 and 2018. Core QI teams consisted of three team members: a physician leader, a nurse/nurse practitioner or medical assistant, and an administrative staff/office manager. Core team members were expected to educate the other participating practitioners from their practice on the learning collaborative content. Purposeful selection of practices that applied was used

in an attempt to ensure seek diversity in setting (ie. urban, suburban, rural), size, and past QI experience. All physician members in each practice that submitted data and completed the project received American Board of Pediatrics (ABP) Maintenance of Certification (MOC) IV credit for participation. This credit was offered through the Ohio Chapter of the AAP as a portfolio sponsor through the ABP to offer MOC Part IV credit.

Screening Tool Development

In waves 1- 3 and online, the Ohio AAP developed and utilized screening surveys to address appropriate age-related injuries for each WCV through one year of age. The first year of life was chosen for screening because families have the most WCVs to attend and there are fewer screening tools already in practice (eg. developmental screen, vision screen, etc.). Questions were based on age-appropriate IP recommendations adapted from the AAPs TIPP program[®]. Surveys addressed four to six injury topics with one to four questions per topic (total of 10-20 questions per survey). Questions concentrated on current behaviors of families more than attitudes about prevention. Severe injury mechanisms published in the literature at each age interval were emphasized. Each screening tool was reviewed by a core IP team made up of members from the AAP's Council on Injury, Violence, and Poison Prevention and was pretested with approximately 10 parents per WCV age group to ensure question clarity, ease of completion, and comfort with candidness in responding. A test-retest study has shown the injury tool has good reliability.

A hybrid tool to screen for high-risk behaviors, using a previously established IP screening tool as well as the SEEK screening tool for intentional and SDH risks was created for the final waves in 2017-2018. Age-appropriate unintentional injury prevention questions were developed for each age specific category (birth-1 year and 1-5 years). The SEEK team gave consent for us to utilize their tool in this format. In addition to age-appropriate screening questions, the tool also had a column for an individual in the office staff to check whether the caregiver's response was appropriate or if counseling

was recommended. Another column on the tool listed if discussion by the provider was completed. Healthcare providers were provided talking points for each topic area covered on the Injury Prevention + SEEK (IP+SEEK) tool, as well as an answer key for easy assessment.

Pre-work

Each interested pediatrician and practice core team participated in a pre-work phone conference outlining the program's requirements. For baseline data to be completed prior to the face-to-face learning collaborative. Teams were instructed to complete a storyboard, a practice aim statement, and each pediatrician's office staff was required to review five randomly selected patient medical records from the prior month for each WCV for children ≤ 1 year of age and younger (30 total visits) prior to the face to face learning collaborative. A chart review tool was provided to each participating pediatrician to assess current IP counseling and documentation at each WCV in the first year of life. Chart reviews were compiled onto a summary sheet, entered into SurveyMonkey®, and analyzed in Microsoft Excel to determine the amount of IP discussion provided by topic at each site at baseline. prior to the implementation of the screening tool.

Learning Collaborative

After the pre-work period, core team members from each practice attended a 1 day face-to-face learning session. Learning session objectives were to educate team members about: the importance of discussing IP at a WCV, principles of QI work, including how to conduct Plan-Do-Study- Act (PDSA) cycles, how the IP screening tools were developed, and the monthly data collection and reporting strategy. At the conclusion of the collaborative, each team was provided with IP screening tools, grading sheets and strategies to implement the tool into practice.

Action Periods

For six to eight months following the learning sessions, teams worked to employ the developed IP screening tools within their practice at WCVs. On a monthly basis, practice teams reviewed five

randomly selected charts. Summary forms were used to aggregate chart review data by provider, and then entered into the SurveyMonkey® website, similar to pre-work data collection. Each month, core team members participated in a conference call and webinar to review practice team and collaborative data to capture qualitative feedback and to determine areas of success or needs for improvement. In addition, these calls typically incorporated a 15 minute lecture on an injury topic relevant to children 5 years of age and younger. Finally, teams completed a monthly report outlining their progress changes and PDSA cycles attempted. These practice narratives served as a mechanism for the project team to identify successes and challenges as well as capture qualitative feedback on the ease and effectiveness of using the IP screening tool. Responses from monthly practice narratives helped guide action period call topics and discussions.

Data Collection/ Analysis

Frequencies were determined to assess percent of providers utilizing the screening tool, all age appropriate topics covered at WCV, number of office system changes employed, and specific IP AG topics covered at each WCV. A measures table was created to standardize data collection; since many topics contained multiple questions, a topic was considered covered if the family answered all questions within that topic correctly or if at least two questions per topic were addressed and documented when a family answered questions incorrectly.

EASE Hospitalist Safe Sleep Project

The OAAP initiated the EASE (Education and Sleep Environment) Injury Prevention Collaborative in 2014 with the aim of increasing observed safe sleep behaviors among infants ≤ 1 year of age in children's hospitals throughout Ohio. The Ohio AAP, OCHA, and the physician leadership team in the project were key stakeholders in planning. A total of 15 hospitals participated in 2 live waves of the project in 2014 – 2016, and an additional 20 hospitals participated in the online learning collaborative. The Ohio AAP recruited a lead pediatric hospitalist physician from each participating

hospital. All physicians received Part IV Maintenance of Certification (MOC) credit for active participation.

Interventions

The collaborative's leadership team held a 2-hour on-site (with online option) learning session following baseline data collection. Through interactive lectures, the leadership team used the learning session to educate participating teams about safe sleep evidence-based guidelines, local statistics, QI principles, and utilization of Plan-Do-Study-Act (PDSA) cycles within their institutions. Hospitalist teams then had the opportunity at the end of the session to meet together and begin the construction of their key driver diagrams with assistance from AAP staff. Following the learning session, we encouraged teams to continue their work on their key driver diagrams to tailor interventions specific to the needs of their respective hospitals. We urged multidisciplinary interventions on the areas of physician and/or nursing staff education, through online modules, Grand Rounds, or resident lectures; environmental management strategies, such as the acquisition of sleep sacks to replace loose blankets; policy creation or revisions; and/or parental support and education. The Ohio AAP required teams to complete 3 PDSA cycles during the 10-month "action phase" of the collaborative. Hospital teams held scheduled meetings during this time to discuss progress and steps needed to meet final goals.

To further participant knowledge about safe sleep and associated areas of interest, the leadership team held monthly action period conference calls, similar to webinars, during the collaborative for all hospitalist leaders and any interested team members. We required attendance from at least 1 member of each team for 75% of all calls. The leadership team analyzed and reviewed run charts with hospitalist team members to assess the progress of both individual teams and the collaborative, to share best practices, and to identify concerns and problems. We also educated teams on safe sleep practices, infant mortality, injury prevention, QI, and resources to promote safe sleep behaviors during these hour-long calls.

Data Collection

The Ohio AAP instructed teams to collect baseline data by conducting random safe sleep audits of patients ≤ 1 year of age admitted to the general medical/surgical units at their hospital using an audit tool for 2 months prior to active participation. Observers were multidisciplinary, including nursing staff, resident physicians, attending physicians, or patient care assistants, and were used per the hospitalists' discretion. Hospitalists educated observers at each hospital by using examples (ie, PowerPoint photographs of simulated patients in unsafe and safe sleep environments) and a discussion of the audit tool components. The audit tool, developed by team investigators, asked questions regarding infants' sleep location and position, head of bed elevation, loose items found in the sleep environment, inappropriate developmental tool use, and family education on safe sleep (available by request). One hospital piloted the tool before dissemination for ease of use and understanding. The leadership team held each site responsible for educating observers on how to document on the tool and for its completion on a consistent basis. The teams imported paper copies of the completed tools into SurveyMonkey® at each site for data analysis and site comparisons.

We required teams to randomly audit at least 10 patients per week (total of 40 patients monthly) at each hospital during the action phases. Each site had the option to limit their audits to only a few units or to include all general medical/surgical units in the hospital and could audit >10 patients weekly if time permitted. Teams audited primarily during typical "sleeping hours" and could audit patients at any point during their hospital admissions. Exclusion criteria were as follows: patients located in ICUs, including NICUs; patients with tracheostomies; ventilator or noninvasive ventilator dependence; recent spinal surgeries; or upper airway anatomic abnormalities. We also excluded infants who were found to be awake during the audit from final analysis. We included all other infants with diagnoses and conditions not stated previously for eligibility for random auditing and for inclusion in the study. Teams collected data in a similar manner after the baseline period for 10 additional months.

Measures

The primary objective was for each hospital to show that >90% of infants ≤ 1 year of age not meeting exclusion criteria were in a “safe sleep environment” on random weekly audits by the end of the project. We calculated this measure by taking the number of audited infants found in appropriate sleep environments divided by the total number of audited infants. A secondary objective was for each hospital to provide safe sleep education to >90% of parents/caregivers of infants not meeting exclusion criteria at any time during admission from the hospital. We calculated this measure by taking the number of infants whose caregivers reported the occurrence of safe sleep education at the participating hospital by the time of the audit divided by the number of infants whose parents were present and awake enough at the time of the audit to answer the question.

EVALUATION:

Performance measures were established for participating physicians in each program. These included:

Pediatricians and primary care providers who currently discuss safe sleep practices 40% of the time will provide targeted advice and guidance at the newborn, 2-month, and 4-month well child visits 90% of the time.

Parents who use safe sleep practices only 50% of the time or less will increase to 80% by the 4-month well child visit.

Hospitals would observe an infant sleeping in a safe environment (on the back, in a bare crib) 90% of the time during random observations.

The program was evaluated by the attainment of the objectives described in performance measures. Participating physicians collected data at well-child visits or hospital observations, and reported the data back to the Ohio AAP for analysis. Discussion of data results occurred regularly with the project team and participants; revision of performance objectives occurred between individual

waves of the projects to ensure objectives were SMART (specific, measurable, attainable, related to the goal, and timely).

RESULTS/OUTCOMES:

Injury Prevention Learning Collaborative Project

At baseline, prior to the start of the collaborative, no practice utilized any type of IP screening tool. By the end of the first wave intervention period, 97.2% of the charts reviewed utilized the tool. Of note, almost all of the participating practices consistently employed the tool into their daily routine in the first 2 months of the action period. Qualitative information obtained from the monthly practice narratives indicated that several simple changes in the practice were essential to increasing tool usage; these included: providing tools to be completed by guardians while in the waiting room, utilizing a transparent scoring sheet to improve staff grading of the tool, and highlighting specific talking points prior to patient encounters with the physician.

With increased screening tool usage by all pediatricians, a significant increase in all safety topics being covered at each WCV occurred. Prior to incorporating the tool into practice, less than one-third of all WCVs for children one year of age and younger covered all recommended, age appropriate IP topics. Post-intervention, all topics were covered more than 88% of the time at every age-appropriate WCV. In addition to the increase in all age-appropriate IP topics being covered, there was an increase in IP topics covered for each mechanism of injury. Almost all mechanisms were addressed at least 90% of the time by the end of the QI program. In wave 1 data, greatest overall percent increase in discussions about injury by mechanism occurred in: water (84.9%), play (75.65%), and supervision safety (73.61%).

A revision between waves 1 and 2 of the IPLC allowed for the tracking of behavior change using the screening tools. Given that the family receives the same survey at the newborn, 2 month and 4 month visit, and then another survey at the 6 month, 9 month and 12 month visit, an electronic data

collection tool was developed that tracks answers from one well child visit to the next for any given child. The data collection system allows for the tracking of which caregiver for the child completes the screening tool as well. Results indicated behavior change did occur during Wave 2 of the IPLC. Of 181 families with repeat screenings at newborn to 4 month visits, 52% of families made a change in at least 1 of their risky behaviors upon provider discussion of appropriate anticipatory guidance. For 6 to 12-month well-child visits 92 families had repeat screenings, and 62% of families made a change in at least one high-risk safety behavior following provider discussions.

As part of a Healthy Tomorrow's Technical Assistance program, the Ohio AAP participated in Return on Investment (ROI) analysis with the Altarum Institute in 2016. Three-year program costs and effectiveness of behavior change were compared with injury cost savings for two common injuries: safe sleep and child passenger safety. Return on investment was calculated using a template adapted from The Business Case for Quality in Medicaid Managed Care developed by the University of North Carolina at Chapel Hill in 2007. Average lifetime medical and parental work loss costs were estimated using published literature assuming the value of a saved infant life to be \$10 million. Conservative estimates of the IPLC results for this ROI analysis found that: for every 10,000 children screened for safe sleep in the program, approximately 1 death will be prevented; for every 20,000 children screened for car seat safety in the program, approximately 1 incapacitating injury will be prevented. The cumulative ROI after 3 waves of the project is \$31.01 – translating to a \$31.01 return for every \$1.00 spent, and the Net Present Value of the program after 3 waves is approximately \$22 million.

Discussion

This study demonstrates several important findings regarding IP screening and counseling in the pediatric office setting. From baseline data, the lack of injury AG being covered and documented by pediatricians is evident. No injury topic was addressed more than 50% of the time prior to initiation of the IP screening tool; similar to findings from a survey of the same population at a prior time.

Findings also suggest that pediatricians can easily implement an IP screening tool into their daily practice and within a few months they can consistently screen and cover all age appropriate IP topics with families. Even topics that were commonly addressed initially, such as car safety seats and sleep safety, were covered significantly more often after the screening tool was adapted into practice. Finally, all recommended IP topics were covered more frequently as a whole; each WCV for children ≤ 1 year of age showed increases in overall discussions up to 88- 95%. Since injuries are rare occurrences in a family's life, the more topics that can be addressed along with targeted advice being given, one would hope more of these injuries can be prevented.

Our QI collaborative is consistent with and further validates information learned from other studies about current injury AG discussions in pediatric offices. PCPs typically screen for only a few injury mechanisms to assess risk and documentation of injury AG is infrequent. Most research has concentrated on addressing one injury prevention mechanism and the lack of AG offered to families. However, all practitioners realize that there are many injury prevention behaviors that need to be addressed, but this comprehensive discussion is not possible in a brief clinical encounter.

Although the idea of using screening tools to assess injury risk in the primary care setting is not novel, the tool we developed was different than others published in the past. Injury screening tools were first introduced by the AAP when they developed their Framingham Safety Surveys, a part of the TIPP program®. These screening tools, although effective, have not been used regularly over time, as they were expensive to print and many did not employ them consistently into every day practice. With advances in health communication technology, many groups have moved towards computerized assessments to help individualize the safety information provided. Again, these tools can be useful in the primary care setting, but many primary care practices do not have access to computerized technology, they have been used on convenience samples only, and they have been implemented directly into a patient's chart. As a result, our tool was developed to address the most common injury

mechanisms for youth one year of age and younger, a tool that was easy to grade, specific talking points to help guide physician discussions with families despite the physician's past experience, and the tool could be placed directly into the patient's chart for later reference.

Finally, the QI methodology of this study showed that all PCPs were able to consistently employ our injury screening tool within their practice, in a very short period of time. Although each practice performed their own PDSA cycles, most practices only needed to employ three office system changes in order to have the tool used at every visit. Also, by having a monthly collaborative call, practices could learn from each other as to most effective changes and potential pitfalls. PCPs reported during these calls that they were surprised at the lack of knowledge the families had around injury topics, and felt that the educational component of the action period calls better equipped them to provide appropriate, more consistent counseling to these families as a practice. Another unique feature of this study was that utilizing the QI model, physicians obtained needed Part IV Maintenance of Certification credits while providing a higher quality service and more comprehensive injury screening for families.

EASE Hospitalist Safe Sleep Project

In the pilot wave team members submitted 5343 total audits during the 12-month collaborative; 87.8% (4692) of these patients were included in statistical analysis. All but 1 hospitalist team submitted the requisite number of audits by the end of the collaborative, and all teams met the 75% Action Period Call attendance requirement. Similar data results were obtained in follow up waves of the project.

Safe Sleep Environment

By the end of the collaborative, there was a 26% increase of infants observed to be in a safe sleep environment. Two institutions had improvements of ~70%. The greatest behavioral change was noted in the removal of excess items in the crib, with a 29% increase in bare cribs. Specifically, there

was a significant increase in the presence of blanket-free cribs by the end of the collaborative, from 50.0% to 77.8%. There was no significant change in infant location from the onset to the end of the collaborative (91.6% to 89.4%), as infants were found in their cribs in most audits. Similarly, there was no significant change in position (84.0% to 84.7%); most infants were found on their backs during the collaborative. The most commonly cited interventions used by the hospital teams were creation or revision of an existing hospital safe sleep policy; use of print materials presented at the time of hospital admission to educate families and caregivers on appropriate safe sleep behaviors; and education on implementation of the AAP recommendations to nursing and ancillary staff through mandatory online modules, scheduled unit conference days, and institutional meetings.

Family Education of Safe Sleep Practices

At baseline, 48.2% of families/caregivers reported that they had received education on safe sleep practices during their admission before the audit. There was a significant increase in family-reported education of safe sleep practices by the end of the collaborative to 75.4%. Parents reported that direct safe sleep education by staff, primarily the nursing staff at the time of hospital admission, was the modality used most commonly (85.3%). Other family education modalities used by institutions included brochures provided to families by nursing staff at admission, posters in patient rooms and unit hallways, public safety announcements on in-room televisions or tablets (such as a statewide safe sleep public service announcement), and digital signage in heavily trafficked areas.

Discussion

To our knowledge, this is the first QI collaborative for children's hospitals in 1 state to focus on modeling appropriate safe sleep behaviors for families. As a result of this QI intervention, hospitalized infants ≤ 1 year were observed to be placed in appropriate safe sleep environments significantly more often. Although safe sleep rates did not reach our goal of 90%, significant improvement was observed over a short period of time. Rates of family/caregiver reports of safe sleep

education during hospital admission also increased significantly due to interventions placed in the QI program.

Of note, our baseline data were similar to those seen in previous studies examining safe sleep behaviors in the hospital setting, with a large majority of patients found in unsafe sleep environments, primarily due to loose items in the crib. In all institutions involved in the collaborative, environmental and policy changes were used to bring about significant changes in behaviors. Several institutions focused on creation or revision of existing safe sleep policies to align with the 2011 AAP guidelines. Many hospitals partnered with HALO to provide SleepSacks for infants and to eliminate the use of loose blankets. Education for all inpatient health care providers, including physicians, nursing, and support staff, and parents and caregivers was also essential for the success of the project. Of note, the amount of change in each institution did not necessarily correlate with that institution's final results at the end of the collaborative.

Not surprisingly, we noted that those institutions that had strong support from their administrations tended to have greater increases of safe sleep behaviors than those that did not have that support. Those teams with appropriate backing were able to purchase needed sleep sacks, easily pass hospital policy revisions, and incorporate the safe sleep behaviors into the institutions' culture and workflows; those without the vocal assistance of administration struggled to accomplish the same goals during the collaborative and did not score as highly. We surmise that a unified message regarding the importance of implementing system-wide safe sleep behaviors; from a hospital's leadership team down to the physicians, trainees, and nursing and ancillary support staff; is paramount to the success of many of our highest-rated teams and is likely a key factor for the success and sustainability of future safe sleep initiatives.

PUBLICATIONS/PRODUCTS:

Publications (Peer Reviewed):

Macklin JR, Gittelman MA, Denny SA, Southworth H, Arnold MW. The EASE Quality Improvement Project: Improving Safe Sleep Practices in Ohio Children's Hospitals. *Pediatrics* 2016 Sep 14. pii: e20154267. PMID: 27630074.

Gittelman, MA, Kincaid M, Denny S, Arnold MW, Fitzgerald M, Carle AC, Mara CA. Evaluating the Reliability of an Injury Prevention Screening Tool: A Test-Retest Study. *J Trauma Acute Care Surg.* 2016 Oct;81(4 Suppl 1):S8-S13. doi: 10.1097/TA.0000000000001182. PMID: 27488487

Gittelman MA, Denny S, Anzeljc S, FitzGerald M, Arnold MW. A Pilot Quality Improvement Program to Increase Pediatrician Injury Anticipatory Guidance. *J Trauma Acute Care Surg.* 2015 Sep;79(3 Suppl 1):S9-14. doi: 10.1097/TA.0000000000000672. PMID: 26131790.

Publications (In Progress for Peer Review):

Vilvens HL, Vaughn H, Southworth MS, Denny, SA, Gittelman, MA. Effective safe sleep messaging for caregivers of infants less than one year old. Submitted to *Journal of Child Health Care*, 2018.

Macklin J, Gittelman MA, Denny S, Southworth H, Arnold MW. Comparing Infant Safe Sleep Practices Between Birthing and Children's Hospitals in Ohio. Submitted to *Hospital Pediatrics*, 2018.

Gittelman MA, Southworth H, Denny S, Lifsey S, McDuff MA, Anzeljc S, Wervey Arnold M. Estimated Cost Savings of an Office-Based Injury Prevention Counseling Program. Plan to complete and submit in 2018.

Denny S, Gittelman MA, Southworth H, Anzeljc S, Wervey Arnold M. Pilot of primary care physician discussion and resource allocation after screening for unintentional injuries and social determinants of health. Submitted *Injury Epidemiology*, 2018.

Abstracts and Research Presentations for Healthcare Professionals:

Gittelman MA, Denny S, Southworth H, Anzeljc S, Wervey Arnold M. Pilot of primary care physician discussion and resource allocation after screening for unintentional injuries and social determinants of health. Oral presentation at the Injury Free Coalition for Kids National Conference, Ft Lauderdale, FL, November 2018.

Denny S, Gittelman MA, Arnold MW, Southworth H. A gun neutral partnership to promote the safe storage of firearms. Accepted for oral presentation at NCE AAP National Meeting, Chicago, IL, September 2017.

Gittelman MA, Southworth H, Denny S, Lifsey S, McDuff J, Anzeljc S, Arnold MW. Estimated cost savings of an office-based injury prevention counseling program. Oral presentation at the Annual Meeting of the Ambulatory Pediatric Association in San Francisco, CA, May 2017.

Macklin J, Gittelman MA, Denny S, Southworth H. The EASE Program. Oral Presentation at the Annual Cribs for Kids Conference, Pittsburgh, PA, April 2017.

Vilvens H, Vaughn L, Gittelman MA, Southworth H, Denny S. Creating Effective Safe Sleep Messaging for Caregivers of Infants Less than 1 Year Old. Oral Presentation at the Annual Cribs for Kids Conference, Pittsburgh, PA, April 2017.

Macklin J, Gittelman MA, Denny S, Southworth H. A comprehensive program to improve inpatient infant safe sleep practices. Oral presentation at the Quality and Safety in Children's Health Conference, Orlando, FL, March 2017.

Macklin J, Gittelman MA, Denny S, Southworth H. Comparing Infant Safe Sleep Practices Between Birthing and Children's Hospitals in Ohio. Oral presentation at NCE AAP National Meeting, San Francisco, CA, October 2016.

Gittelman MA, Denny S, Anzeljc S, Arnold MW. An educational program for physicians to teach the principles of injury anticipatory guidance and earn certification credits. Poster presentation at the Annual Meeting of the Ambulatory Pediatric Association in Baltimore, MD, April 2016.

Gittelman MA, Denny S, Farkas M, Arnold MW. A viral marketing campaign to increase safe sleep awareness among the public and large retailers. Poster presentation at the Annual Meeting of the Ambulatory Pediatric Association in Baltimore, MD, April 2016.

Gittelman MA, Denny S, Anzeljc S, Arnold MW. An Educational Program for Physicians to Teach the Principles of Injury Anticipatory Guidance and Earn Certification Credits. Oral presentation at the Injury Free Coalition for Kids National Conference, Ft Lauderdale, FL, November 2015 – Best Program Presentation at the Conference.

Gittelman MA, Kincaid M, Denny S, Arnold MW, Carle A. Testing the Reliability of an Injury Prevention Screening Tool Between Individuals Within a Household. Oral presentation at the Injury Free Coalition for Kids National Conference, Ft Lauderdale, FL, November 2015 – Best Original Research Presentation at the Conference.

Macklin J, Denny S, Gittelman MA. When Sleeping Isn't Safe: Improving Safe Sleep Practices in Ohio with the EASE Project. Oral presentation at the Pediatric Hospital Medicine National Conference, San Antonio, TX, July 2015.

Gittelman MA, Macklin J, Denny SA, Southworth H. A Quality Improvement Program to Improve Safe Sleep Behaviors within Ohio Children's Hospitals. APA Presidential Plenary at the Annual Meeting of the Ambulatory Pediatric Association in San Diego, CA, May 2015.

Macklin J, Denny S, Gittelman MA. When Sleeping Isn't Safe: Improving Safe Sleep Practices in Ohio with the EASE Project. Oral presentation at the Injury Free Coalition for Kids National Conference, Ft Lauderdale, FL, November 2014.

Gittelman MA, Denny S, Anzelic S, Arnold M. A Quality Improvement Program Implemented into primary pediatrician offices can encourage families to practice safer behaviors. Poster Presentation at the American Academy of Pediatrics National Conference and Exhibition, San Diego, CA, October 2014 and oral presentation at the Injury Free Coalition for Kids National

Conference, Ft Lauderdale, FL, November 2014.

Denny S, Gittelman MA, Wervey-Arnold M, Southworth H. Put A Lid On It, A Statewide Bike Helmet Program, Reaching Many and Increasing Helmet Usage. Poster Presentation at the American Academy of Pediatrics National Conference and Exhibition, San Diego, CA, October 2014.

Gittelman MA, Denny S, Anzeljc S, Fitzgerald M, Arnold MW. A Quality Improvement Program Implemented into Primary Pediatrician Offices to Increase Injury Anticipatory Guidance Discussion and Documentation. Oral presentation at the Annual Meeting of the Ambulatory Pediatric Association in Vancouver, Canada, May 2014.

Denny S, Gittelman MA, Arnold M, Southworth H. An Effective Statewide Public Awareness Campaign to Encourage Legislators, Media, and Community Organizations to Support Bicycle Helmets. Oral Presentation at the Injury Free Coalition for Kids National Conference, Ft. Lauderdale, FL, November 2013.

Gittelman MA, Denny S, Anzeljc S, Wervey Arnold M. Pediatric documentation of injury anticipatory guidance: if it's not documented, it wasn't discussed. Poster presentation at the Annual Meeting of the Ambulatory Pediatric Association, Washington, DC, May 2013.

Presentations for Healthcare Professionals:

2018, Pediatrician Counseling on Injury Prevention: Pitfalls, Literature, and Potential Solutions, Noon Conference MetroHealth, Cleveland, OH

2017, AAP Utah Chapter – MOC 2: Injury Prevention 0-4 Years of Age, Salt Lake City, UT

2017, AAP San Diego Chapter - MOC 2: Injury Prevention 0-4 Years of Age, San Diego, CA

2017, AAP Ohio Chapter Annual Meeting – MOC 2: Injury Prevention 0-4 Years of Age, Columbus, OH

2017, OH AAP SEEK / Injury Prevention Learning Collaborative, Columbus, OH

2016, AAP Texas Pediatric Society Annual Meeting – MOC 2: Injury Prevention 0-4 Years of Age,
Austin, TX

2016, AAP North Carolina Chapter Annual Meeting - MOC 2: Injury Prevention 0-4 Years of Age,
Pinehurst, NC

2016, AAP Ohio Chapter Annual Meeting - MOC 2: Injury Prevention 0-4 Years of Age, Columbus,
OH

2016, AAP Ohio Chapter Annual Meeting – MOC 4 – Injury Prevention Quality Improvement
Program Introduction, Columbus, OH

2016, Ohio Dept of Health – Infant Mortality Research Group, Columbus, OH – Recommendations to
Attack Sleep-Related Deaths

2016, Grand Rounds – Nemour’s Children’s Hospital, Orlando, FL – Injury Prevention and Physician
Responsibility

2015, Grand Rounds – Holz Children’s Hospital, Miami, FL - Pediatrician Counseling on Injury
Prevention: Pitfalls, Literature, and Potential Solutions

2015, Pediatric Care Council, Columbus, FL – Pediatric Injury Prevention QI in the Office Setting

2015, MOC 2 Injury Prevention 0-4 years of age, AAP District 5 & 8 Regional Meeting, Portland, OR
& OH AAP Annual Meeting, Columbus, OH

2015, Medical Directors Role in Providing PCP QI Programs, AAP District 5 & 8 Regional Meeting,
Portland, OR

2014, Grand Rounds, Cleveland Rainbow Babies - Injury Prevention and Advocacy: The
Pediatrician’s Role

2014, Ohio Hospital Association, Safe Sleep Action Plan

2014, Ohio Collaborative to Prevent Infant Mortality, Ohio AAPs Comprehensive Approach to
Addressing Ohio’s Infant Safe Sleep

2014, Ohio Department of Health/Ohio Equity Institute Webinar, Infant Safe Sleep in Ohio

2013, OH AAP Quality Improvement Program – Injury Prevention and Anticipatory Guidance: A New Tool is Needed – Wave 2

2013, National AAP Advocacy Summit– How to Succeed at Advocacy: Ohio’s Case Study on Injury Prevention, Chicago IL.

Media Campaigns:

1. Bike Helmet Safety Awareness Month; May 2014
2. SIDS Awareness Month; October 2014
3. Child Abuse and Neglect Awareness Month; April 2015
4. Bike Helmet Safety Awareness Month; May 2015
5. SIDS Awareness Month; October 2015
6. Child Abuse and Neglect Awareness Month; April 2016
7. Bike Helmet Safety Awareness Month; May 2016
8. Safe Sleep Awareness Month; June 2016
9. SIDS Awareness Month; October 2016
10. Child Abuse and Neglect Awareness Month; April 2017
11. Bike Helmet Safety Awareness Month; May 2017
12. SIDS Awareness Month; October 2017
13. Store It Safe Firearm Safety Awareness Month; November 2017
14. Child Abuse and Neglect Awareness Month; April 2018
15. Bike Helmet Safety Awareness Month; May 2018

Other Products:

1. Injury Prevention Plus SEEK Screening Tool (Birth – 1 Year); for use by pediatricians, 2017
2. Injury Prevention Plus SEEK Screening Tool (1 – 5 Years); for use by pediatricians, 2017

3. Prescription for Safe Sleep; handout for use with families, 2016
4. EASE QIDA Learning Module; for online professional quality improvement, 2016
5. IPLC QIDA Learning Module; for online professional quality improvement, 2016
6. SIDS Awareness Month Special Edition, Ohio Pediatrics; for public and professionals, 2016
7. Sample Hospital Safe Sleep Policy; for use by hospitals, 2015
8. Injury Prevention Part II MOC Self-Assessment (Birth – 4 Years); for professional education, 2015
9. Injury Prevention Part II MOC Self-Assessment (Adolescent); for professional education, 2015
10. Safe Sleep Infographic; handout for use with families, 2015
11. EASE Audit Tool; for use by hospitals to audit safe sleep observations, 2014
12. What is a safe sleep environment?; handout for use with families, 2014
13. www.ohioaap.org/safesleep; website for professional and family education, 2014
14. Injury Prevention Screening Tool (Birth – 4 Months); for use by pediatricians, 2013
15. Injury Prevention Screening Tool (6 Months – 1 Year); for use by pediatricians, 2013

DISSEMINATION/UTILIZATION OF RESULTS:

The results of this program have been disseminated through a variety of measures, as demonstrated in the extensive list of publications and products. Key methods of utilizing results include the spread of the pilot QI program to additional practices in Ohio, and then to pediatric practices nationwide. Following three waves of the program operated as traditional IHI Learning Collaboratives, and online version of the project was created. This online learning module utilized the National AAP's Quality Improvement Data Aggregator, or QIDA, system to allow for the program to be completed in a self-directed form by pediatricians in any state or country.

In addition, results were used to create education in the form of ABP MOC Part II Self-Assessments, which meet a requirement for pediatricians for recertification. These assessments were

presented at AAP Chapters nationally to expand those with knowledge of the impact of childhood injury and need for provision of anticipatory guidance, as well as to further spread the QI program.

Results have been disseminated in oral and poster presentations to local and national organizations with interest in child health or injury prevention; these include Ohio based children's hospitals, the Ohio Department of Health and partners, Injury Free Coalition for Kids National Conference, and various meetings of state Chapters and national AAP. Manuscripts have also been published in peer-reviewed journals for several stages of the project. Additional manuscripts have been submitted for publication in 2018 for other project activities.

FUTURE PLANS/SUSTAINABILITY:

The Ohio AAP is committed to continuing this injury prevention work, with an emphasis on increasing healthcare provider knowledge of the risks of childhood injuries and spreading screening tool use for children birth to five years of age. Several key relationships have been developed during this project that have provided support over the past five years. These partners include the Ohio Children's Trust Fund and Ohio Department of Health; contracts are currently in place or are being pursued with these partners to continue funding for new and expanded injury prevention services. In addition, the Ohio AAP monitors funding announcements and opportunities at the local, state, and federal level. A system is in place to facilitate applications for funding when suitable opportunities are found.

In addition, many aspects of the project have been built sustainably with intention of in-kind organizational support beyond the initial funding period. For example, the QIDA versions of the QI projects are currently sustained through September 30, 2019. Aspects of this work have been incorporated into other Ohio AAP projects, such as those focusing on smoking cessation or partnerships with Community Health Workers in Ohio. The Ohio AAP's Foundation Pillar has selected injury prevention as a focus area, and pursues charitable donations to support this work. This support allows for continuation of community awareness efforts and support of Ohio pediatricians utilizing

program materials for the foreseeable future. While the Ohio AAP is committed to continuing these programs at no cost to participants, physicians often pay for continuing education; therefore the Ohio AAP could charge a small amount for the Maintenance of Certification approval to sustain the programs, if needed.

Participants in programs have also been surveyed for sustainability plans. 3 years after initial participation, 70% of practices report continued use of all or some of the materials and lessons learned in the project. A majority of practices who sustain the project (80%) do so by incorporating all or portions of screening tools into electronic medical records systems.

3. ANNOTATION

The Ohio Chapter, American Academy of Pediatrics created a screening tool to assist pediatricians in the identification and discussion of risky behaviors for children birth to five years of age in well-child visits, as injury remains the leading cause of death for children in this groups. Providers are able to implement this standardized screening tool in a quality improvement learning collaborative that addresses age-based injury prevention and social determinant of health issues into the well-child visit. These tools increased counseling about injury behaviors and social determinant topics when families self-identified risks, and was found to be reliable. The project demonstrated positive behavior change in two-thirds of families on repeat screenings of the same caregiver following physician discussion of risky behaviors. The Ohio AAP's Injury Prevention Learning Collaborative has been spread to multiple states, spawned additional quality improvement projects and learning opportunities, and shows up to a \$31.00 return on investment for each dollar spent.

KEY WORDS

Social Determinants of Health

Quality Improvement

Anticipatory Guidance

Screening Tool

Pediatricians

American Academy of Pediatrics

Maintenance of Certification

Well Child Visit

Learning Collaborative

Primary Care Provider

Ohio Chapter, American Academy of Pediatrics

Institute of Healthcare Improvement

Injury Prevention

American Board of Pediatrics

Infant Mortality

Early Childhood

Safe Sleep

Child Passenger Safety

Home Safety

4. ABSTRACT OF FINAL REPORT

PURPOSE OF PROJECT: The Ohio Chapter, American Academy of Pediatrics (Ohio AAP) conducted quality improvement and community awareness work to decrease injuries to children. Particular focus was placed upon improving sleep environments for infants through screening and discussion in pediatric well-child visits, and observations at hospitals.

Contact information: Ohio Chapter, American Academy of Pediatrics; 94-A Northwoods Blvd, Columbus, OH 43235; 614-846-6258; marnold@ohioaap.org; www.ohioaap.org

GOALS AND OBJECTIVES: The goals established for this project were selected to relate to prevented injuries or mortality for infants in Ohio. The primary goal would be achieved by improving physician knowledge, confidence, and access to resources to discuss safe sleep and injury prevention with families.

Primary Goal: By July 31, 2016, increase by 10-percent the proportion of infants who are placed to sleep on their backs from a baseline of 72-percent by providing data, educational sessions, and resources to those in a position to reach infant caregivers.

METHODOLOGY: Screening tools were developed and pretested by the Ohio AAP. Two quality improvement learning collaboratives were developed using the tools. Pediatric practices and hospitals were and taught quality improvement theory and injury prevention strategies at learning sessions. Pediatricians worked to implement screening tools and talking points into either primary care well-child visits for children birth to five years of age, or into hospital observations of sleep environments. Monthly, providers reviewed charts for screening tool use and age-appropriate injury prevention discussion, or input audit data for hospital safe sleep observations. Participants received maintenance of Certification IV credit.

EVALUATION: Performance measures were established for participating physicians in each program. These included:

Pediatricians and primary care providers who currently discuss safe sleep practices 40% of the time will provide targeted advice and guidance at the newborn, 2-month, and 4-month well child visits 90% of the time.

Parents who use safe sleep practices only 50% of the time or less will increase to 80% by the 4-month well child visit.

Hospitals would observe an infant sleeping in a safe environment (on the back, in a bare crib) 90% of the time during random observations.

The program was evaluated by the attainment of the objectives described in performance measures. Participating physicians collected data at well-child visits or hospital observations, and reported the data back to the Ohio AAP for analysis. Discussion of data results occurred regularly with the project team and participants; revision of performance objectives occurred between individual waves of the projects to ensure objectives were SMART (specific, measurable, attainable, related to the goal, and timely).

RESULTS/OUTCOMES: Sixteen pediatricians (six practices) participated in the pilot wave of the primary care project. Screening tool use increased from 0% to 97.2% in just 3 months of the program. For each well-child care visit, injury prevention discussion increased by 89.5% for newborn visit, 88.1% for 2-month, 93.6% for 4-month, 94.0% for 6-month, 88.1% for 9-month, and 90.3% for 12-month-old babies. During the quality improvement program, discussion points for all children 1 year or younger increased for all age-appropriate topics. The greatest percent increase in discussions occurred with water safety (from 10.8% to 95.7%, n = 231), play safety (from 17.9% to 93.5%, n = 154), and supervision safety (from 20.8% to 94.4%, n = 251). More commonly addressed topics also had a significant increase in discussions: sleep safety (from 48% to 93.9%, n = 262), choking (from 44.7% to 95.4%, n = 172), and car safety (from 41.2% to 80.1%, n = 332).

In future wave the primary care tools have been found reliable when completed by the same

caregiver on repeat visits, and two-thirds of families demonstrated behavior change following screening and discussion with their provider. In addition, return on investment analysis of the project shows a value of \$31.00 for every \$1.00 invested in the program.

In the first wave of the hospital based project, teams collected 5343 audits at all participating sites. At baseline, only 279 (32.6%) of 856 of the sleeping infants were observed to follow AAP recommendations, compared with 110 (58.2%) of 189 ($P < .001$) at the project's conclusion. The presence of empty cribs was the greatest improvement (38.1% to 67.2%) ($P < .001$). Removing loose blankets (77.8% to 50.0%) ($P < .001$) was the most common change made. Audits also showed an increase in education of families about safe sleep practices from 48.2% to 75.4% ($P < .001$).

These programs have been replicated in several waves, and lessons learned have been used to develop public awareness campaigns, and materials for family and provider education.

DISSEMINATION/UTILIZATION OF RESULTS: Results of these programs have been distributed widely through oral and poster presentations, spread of QI programming, and public awareness activities.

FUTURE PLANS/SUSTAINABILITY: The Ohio AAP is committed to sustaining these programs through donations, funding relationships developed in the state of Ohio, and in-kind support of program staff time for the foreseeable future.