Tailored Messaging Feedback to Improve Parent Knowledge and Behavior Practices on Pediatric Drowning Prevention

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Abstract

Introduction and Background: Drowning is the leading cause of preventable injury death in Arizona for children under five years old. Tailored education has demonstrated efficacy in behavior change and knowledge retention. The purpose of this evidence-based project was to evaluate if tailored education improved knowledge and self-reported behaviors related to pediatric drowning. The Elaboration Likelihood Model provided the framework for this project.

Methods/Experimental Approach: The prospective pilot project was conducted using the Iowa Model of Evidence Based Practice. Parents with children under five years, presenting with low acuity complaints in a pediatric emergency department were approached. A baseline assessment identified high-risk behaviors and a custom education plan was delivered to parents. Outcome variables were measured at baseline and three weeks after initial assessment.

Results: The average parent age was 29 (M = 28.5; SD = 6.35) years. Participant (n=29) responses were analyzed using descriptive statistics. Participants (n = 27, 93%) reported likelihood to change behaviors and 29 (100%) perceived the tailored intervention as relevant. Secondary outcome variables were not measured at three weeks due to a lack of survey response.

Conclusions: Parents reported a high likelihood of behavior change when water safety education was tailored and relevant to their child. The tailored intervention evoked positive interaction and receptivity from parents and suggested a high motivation to make a behavior change. The effect of the intervention could not be tested due to the lack of follow-up and post data collection. The design of this evidence-based project is quantifiable and replicable in a low-acuity setting, which

allows for future evaluations of self-reported behavior change and knowledge improvement.

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Keywords: pediatric drowning, drowning, water safety, tailored education, supervision, tailored messaging, mobile-based, web- based, technology-based, education, parent knowledge, safety behavior

Drowning is a devastating and complex global public health issue. In Arizona, fatal drowning is the leading causes of preventable injury death for children ages one to four years old. With appropriate guidance, parental knowledge and behaviors, which increase water safety, can be improved. Tailored interventions have been shown to be an effective means of parent education. Using an assessment-based approach with tailored educational feedback is a promising intervention to improve parent knowledge and promote behavior change.

Background & Significance

Fatal drowning is defined as death from water submersion suffocation. Nonfatal drowning is defined as the recovery from a water submersion. Both are devastating and complex global public health issues (Al-Qurashi et al., 2017). The per capita drowning rate takes into account the mass population, which has found that children under five years old are among the highest risk age group for drowning (Arizona Child Fatality Review [ACFR], 2018; Centers for Disease Control [CDC], 2017; U. S. Department of Health and Human Services [USDHHS], 2012). In the state of Arizona, fatal drowning is considered a preventable injury death. Lack of supervision accounted for the majority of those preventable deaths in children (ACFR, 2018; HHS, 2012; Safe Kids, 2016).

Supervision is defined as the act of watching over someone or something with attentiveness (Morronigello, Sandomierski, Zdzieborski, & McCollam, 2012). In 62% of drowning cases, adult supervision was compromised by distractions such as taking a phone call or responding to a text message (Safe Kids, 2016). Various elements affect adult supervision, including parent experience, style of parenting, and perceptions of child injury (Huynh, Demeter, Burke, & Upperman, 2017). Distracted behavior and inadequate supervision increase risk of preventable injuries, including drowning among children (Huynh et al., 2017).

Lack of understanding of developmental norms may increase drowning risk for children in this age group. Permissive parenting styles, attributing injuries as a normal variation of childhood and limited enforced safety rules results in an increase of childhood injuries (Huynh et al., 2017). Further, injury risk may be increased when parents are unable to predict a child's behavior. Limited parental knowledge of child development results in unrealistic behavior expectations of the child (Kendrick et al., 2013). Education is needed to increase developmental knowledge among parents. Educational programming should account for a variety of components such as education level, maternal age, child age, and socioeconomic status.

Parent education is also needed to increase knowledge about the use of life jackets to reduce drowning risk. When incidents involving boating deaths were examined, people who survived were more than two times more likely to have been wearing a life jacket (O'Connor & O'Connor, 2005). One of the main reasons life jackets are necessary for inexperienced swimmers is due to the lack of understanding of how even the slightest lapse in supervision increases the risk for drowning (Safe Kids, 2016). Finally, parent education about appropriate emergency response in response to a drowning is needed. When cardiac arrest related to drowning occurs, cardiopulmonary resuscitation provides the best chance of neurological recovery (Topjian et al., 2012).

Emergency departments treat nearly nine million children for injuries annually. Fatal drowning and near drowning places a substantial burden on the health care system (USDHHS, 2012). All childhood injuries, including drowning, requiring hospitalization incur approximately $87 billion in medical and societal costs (USDHHS, 2012). An average of 4,700 children per year, younger than five years old, were treated in the emergency department for a non-fatal drowning between 2015 and 2017 (Consumer Product Safety Commission, 2018). A reported

96% of the non-fatal drowning victims treated in the emergency department took place in a swimming pool. Children younger than five years old comprised approximately 76% of the victims of a pool- related submersion fatality. These fatalities generally occurred during the summer months of May, June, July, and August (CPSC, 2018). In addition, children from ethnic minorities, such as Hispanic or African-American, experience a non-fatal drowning more than four times that of Caucasian children (Felton, Myers, Liu, & Winders-Davis, 2015).

Lifetime medical and work loss costs associated with a fatal drowning are estimated at nearly $5.7 million and $1.2 billion respectively (HHS, 2012). Children requiring inpatient hospital services incurred costs of approximately $6,372 per episode compared to an ED visit at approximately $4,528 per episode (Felton et al., 2015). In the United States, the annual cost of caring for a drowning victim equates to $173 million (World Health Organization [WHO], 2018). This data demonstrate how financially devastating water incidents are for families and the healthcare system. Unfortunately, fatal drownings increased 30% from 2016 to 2017 and continue to occur despite a parent or family member supervising at swimming pools (ACFR, 2018; Nansel et al., 2002; O'Connor & O'Connor, 2005).

Encouraging an adult to be close by while a child is swimming or near a pool is wise, but is an incomplete strategy to prevent drowning (Hossain, Mani, Sidik, Hayati, & Rahman, 2015; Morrongiello et al., 2012). The National Action Plan for Child Injury Prevention by the Centers for Disease Control and Prevention is committed to preventing childhood injury and drowning. Their goal is to raise awareness, highlight prevention solutions, and mobilize action (HHS, 2012). An Arizona pediatric hospital organization also has taken action by examining studies about drowning causation, directing conversations with parents, and participating in child fatality review teams (T. Isaacson, personal communication, October 2017). The Injury Prevention

Center is able to evaluate adverse childhood experiences (ACES), trauma, substance abuse, lack of understanding of developmental norms, and behavioral health issues as contributors to drowning risk. In addition, the team examines parental behaviors and parents view supervision or non-supervision as contributing to increased risk (T. Isaacson, personal communication, October 2017).

With so many factors to consider, delivering concise and clear educational messaging is critical. Improved communication and education may better inform families to implement evidence-based injury prevention strategies into their daily routines (McDonald et al., 2005; Morrongiello et al., 2012; Nansel et al., 2002). The use of innovative media and educational technologies to examine parent knowledge and behaviors surrounding water safety is promising (Dijkstra, & De Vries, 1999). Using an assessment-based approach to target specific parental needs will help guide tailored education so that parents are more likely to engage in behavior change and continue that improvement long term (Morrongiello et al., 2012; Nansel et al., 2002).

Purpose Statement

The purpose of this evidence-based project was to evaluate if tailored education improves parent knowledge and self-reported behaviors related to drowning after identifying high-risk behaviors from a risk assessment.

Problem Statement and PICO question

This review evaluates how tailored education improves parent knowledge and self-reported behaviors related to drowning. The evidence search PICO question is as follows: For caregivers with children age one to four years old (P), how does a parent education program (I), compared to a community education program (C), improve caregiver knowledge (O).

Search Strategy

The main aspects of the PICO question were searched in several databases including PubMed, the Cochrane Library, CINAHL, PsycInfo, and the Turning Research Into Practice (TRIP) databases (See Appendix G). The initial search strategy included the key words: *parent or adult or caregiver (population)* and *community education or parent education or parent based or community based (interventions*).

The outcome of interest included *parent knowledge or drowning prevention or child safety.* Search limits were applied to include all literature from 2013 to 2018 in order to narrow to a more manageable search. The PubMed search initially produced 1,192 results, and this modified search produced 2,128 results in the Cochrane Library; 27,056 results in CINAHL; 23,004 results in PsycInfo; and 627 results in TRIP database. No search limits were placed in PubMed due to the moderately narrow search results generated by the key words used. Next, a combination of the key words were used in each database using the Boolean connector “and” and “or” with the year search limits of 2013 to 2018. In addition, the literature was filtered to obtain reviewed articles only. This moderately refined search yielded 7,054 results in PsycInfo; an insignificant reduction to 26,472 results in CINAHL; and 2,128 results in the Cochrane Library. The TRIP database was unable to filter the literature with a peer-reviewed option during the search. Specific key words were utilized in the five databases including: *parent program and drowning or water safety or supervision*. This detailed search yielded 13 results in PubMed; 79 results in PsycInfo; 64 results in CINAHL; and 11 results in the Cochrane Library. The TRIP database search limitations included the ability to select articles based on specific types of methodologies, which produced varying results.

A secondary hand search was pursued in PubMed to identify specific types of education

interventions. A combination of search terms used were *parent-delivered or parenting education intervention or mobile or parent-based intervention or parent training program or web-based or injury prevention program and parent knowledge or child safety or injury prevention.* Search limits of 2013 to 2018 were applied to help narrow the search. These parameters led to four outlier articles that were identified through this hand search. Throughout the initial and secondary search process, non-English studies were excluded. After the completion of the exhaustive literature search, a total of 25 articles addressed at least two elements of the PICO question. Twenty articles resulted with the search terms *web-based, mobile health technology* and *parent knowledge*, and five articles were revealed with the search term *parent-training programs*. Fifteen studies were excluded from the critical appraisal due to insignificant findings, erroneous populations groups, lack of generalizability, and interventions unrelated to the desired outcome. The final yield resulted in 10 studies (See Appendix A). These studies included seven randomized controlled trials (RCTs), one non-random controlled trial, one quasi- experimental study and one systematic review (SR). The flow chart detailing the process of article search strategy and selection can be found in Appendix G.

Review of Literature and Evidence Synthesis

A study by Carlson-Gielen and colleagues (2007) was the first to use the Precaution Adoption Process Model (PAPM) to address parental safety behaviors, parental thoughts and beliefs and how these elements affected the persuasiveness of messaging. One additional study used the PAPM approach by utilizing staged algorithms to identify parents' level of safety behaviors (Shields et al., 2013). Five of the studies reported a reliable and valid tool (McDonald et al., 2005; Nansel et al., 2007; Morrongiello et al., 2012; Gittelman et al., 2014; Glassman et al., 2017). These instruments included a 9-item scale to examine persuasiveness of an

intervention, survey questions using a Likert-scale, and the American for Society Quality (ASQ) scale, which examines six constructs of the Health Belief Model (HBM) (See Appendix B).

Homogeneity was noted in the type of intervention used to deliver tailored messaging to parents. Technological-based interventions were used across all ten studies. Three of the studies used computerized tailored messaging (Carlson-Gielen et al., 2007, Nansel et al., 2002, & Shields et al., 2013) and two used kiosk-based messaging (Gittelman et al., 2014 & McDonald et al., 2005) but both offered parent feedback reports. Other delivery methods included web-based videos, social marketing campaigns, and video-based tailored messaging (VanBeelen et al., 2014, Glassman et al., 2017, & Morrongiello et al., 2012). The systematic review by Omaki and colleagues (2017) identified seven RCTs, which examined the impact of kiosk, computer and mobile technology-based tailored systems. The findings of this review were consistent with previous research and solidified the positive impact technological approaches offer to busy clinical practices. Each technological approach had the ability to tailor safety education to parents and provide immediate feedback in a time-efficient manner. Homogeneity was noted in the examination of safety knowledge scores and behavioral impact of the intervention on parents. This was evaluated in half of the studies (all citations). Two studies examined a combination of self-reported and observed behaviors (Omaki et al., 2017 & Shields et al., 2013). Other dependent variables (DV) included parental perception of safety behaviors, barriers to supervision, risk score assessment, and parent-provider communication (Glassman et al., 2017, Morrongiello et al., 2012, Nansel et al., 2002, & Nansel et al., 2007). (See Appendix B).

Homogeneity was noted in the findings of the significant impact of improved parental knowledge and safety behaviors across all 10 studies that measured these variables. The interventions with a tailored approach resulted in significant findings (Nansel et al., 2002,

McDonald et al., 2005, Carlson-Gielen et al., 2007, Nansel et al., 2007, Morrongiello et al., 2012, Shields et al., 2013, & VanBeelen et al., 2014). Furthermore, parents offered tailored education, based on their needs and experiences, were more likely to engage in behavior change, retain improved safety knowledge, and be able to continue safer practices over a longer period of time. In seven of the studies, homogeneity was noted in the setting type (Carlson-Gielsen et al., 2007, Gittelman et al., 2014, McDonald et al., 2005, Nansel et al., 2002, Nansel et al., 2007, & Shields et al., 2013). These locations included either in an emergency department or pediatric clinic waiting room. Injury prevention education was well received by parents when their child or children presented to these settings with an injury complaint. All 10 studies used a combination of self-reported surveys, true/false questions, and multiple-choice questions to gain insight to parental safety behaviors and knowledge (See Appendix B).

Evidence Conclusions

Understanding risk factors associated with water safety is crucial for the improvement of behavior change and knowledge among parents with young children. Using an assessment-based approach, such as intervention tailoring, parents are able to provide personal behavioral information to receive the most appropriate type of messaging feedback specific to their needs. Parents are more likely to engage in behavior change and continue that improvement long term. Technology-based delivery systems can reach a large population, provide a single platform for providers to tailor water safety information for parents, and compliment verbal instructions given during healthcare visits. A tailored approach can be used in an outpatient setting to address the elements of parental water safety knowledge and behavior, and provide immediate feedback. These elements were consistently recommended across all studies.

Conceptual & Theoretical Model

The Elaboration Likelihood Model (ELM), which was developed by Richard Petty and

John Cacioppo (Petty & Cacioppo, 1986). This theory states that a person is more likely to process and consider information that is relevant to their needs (Petty & Cacioppo, 1986) (See Appendix H). Elaboration is defined as the cognitive act of examining a potentially persuasive argument or opinion. The model proposes that people are active thinkers and processors (Petty & Cacioppo, 1986). The model was designed to explain how communication persuades behavior and attitude changes. The effect of persuasion plays a key role in how people view various issues and objects.

Two types of persuasion processes are dependent upon the degree of elaboration. Both routes involve systematic thinking and other cognitive shortcuts. The central route, which comes from information received that is relevant to personal experiences, occurs when elaboration is high. Parents will use this route to critically analyze the merit of the information received about their drowning risk behaviors and will likely respond in a positive way, regardless of previous knowledge and beliefs (O'Keefe, 2008). The peripheral route relies on outlier sources to guide attitude and belief instead of information processing. Receiving information from an informal source negates the need to critically analyze what is being communicated. Parents who accept advice from family and friends about drowning risk behaviors employ a superficial method of behavior change, without any merit to the information received (O'Keefe, 2008).

Personalized knowledge and beliefs from parents can be customized into tailored messaging to promote behavioral change based on individual needs and experiences (McDonald et al., 2005). In this project, persuasive, relevant messaging can impact how parents view their child's risk of drowning and lead to a high likelihood to engage in behavior change. Using the ELM approach has been shown to result in a permanent attitude change (McDonald et al., 2005; O'Keefe, 2008). Therefore, stimulated cognitive activity can lead to overall improved safety

knowledge concerning drowning and a decrease in high-risk behaviors.

The primary outcome of interest in this evidence-based project was the perceived relevance of tailored education and the likelihood to make a behavior change after the tailored intervention. The plan was to survey participants with two questions about the outcomes following the tailored discussion with the handouts. Additional outcomes of interest, including knowledge retention, usefulness of tailored education, and self-reported behavior change demonstrated by a decrease in risk score from baseline to follow-up also were planned

Evidence Based Practice Model

The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler, 1994) was chosen to guide this project planning and implementation (Appendix I). The Iowa Model is widely used and focuses on problem-solving steps to help clinicians identify a clinical problem or knowledge gap (Titler, Steelman, Budreau, Buckwalter, & Goode, 2001). The step-wise approach includes identifying triggers, clinical application, organizational priorities, forming a team, piloting a practice change, evaluating the pilot, and evaluating practice changes and dissemination of the results (Melnyk & Fineout-Overholt, 2011; Titler et al., 2001). This model emphasizes scientific knowledge about the problem, and formulates a multidisciplinary approach to identify and address a high priority issue among the organization. Robust evidence suggests lack of supervision is among the top causes of pediatric drowning. Children younger than five years of age are most vulnerable. Parental lack of knowledge and perceptions of water safety and dangers factor into undesired outcomes. The Iowa Model helped identify the problem and offered a realistic approach to design and implement an evidence-based project focused on tailored drowning education.

The Iowa Model for this project was used in the implementation process in the pediatric

emergency department setting. The use of the model allowed key stakeholders to evaluate a pilot practice change in order to determine its usefulness in a setting with families presenting to the emergency department with low-acuity complaints. Project team members were carefully selected and included the project team leader, principal investigators, and clinical manager.

Methods

Privacy

Institutional Review Board approval was obtained after an expedited review process through the children's hospital system and Arizona State University. Private health information, including personal emails, was collected for this evidence-based project. All participant information was de-identified and assigned a participant identification number (ID). The survey responses remained anonymous. Names or any other specific identifiers were not be required, nor obtained. Data was exported from the Research Electronic Data Capture (REDCap) system to the SPSS® software, version 25 from the tablet by the project leader. The de-identified data obtained from the surveys was securely stored in an SPSS file on the project leader's personal computer which is password protected.

The REDCap system is a secure, web-based application designed to support data capture for research studies providing 1) an intuitive interface for validated data entry, 2) audit trails for tracking data manipulation and export procedures, 3) automated export procedures for seamless data downloads to common statistical packages, and 4) procedures for importing data from external sources (Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009). The baseline survey link was generated from the REDCap system and contained a singular URL to the survey, which did not track IP addresses, e-mail addresses, or any other identifying information. The follow-up survey link that was e-mailed to the participant contained a unique URL that was only

valid for one submission via the REDCap system. After discussion, consent forms were signed prior to beginning the survey to protect private information due to the collection of personal email addresses. Consent forms were stored in a file locked cabinet in the Center for Family Health & Safety office at Phoenix Children's Hospital and will be shredded after project results are disseminated.

Project Design

This evidence based project was conducted to examine the effectiveness of tailored education for promoting knowledge retention and self-reported behavior change related to drowning prevention by parents with children less than five years old. Outcome measures of interest included likelihood of behavior change and parental views of relevance of tailored education immediately following the tailored intervention. Additional planned outcome measures of interest included usefulness of the tailored education, knowledge retention, and self-reported behavior change. Parent knowledge and self-reported behaviors related to water safety are identified based on a calculated score from the parent assessment survey (Mangione, Imre, Chow, Linsiski, & Heitz, 2015; McDonald et al., 2005; Morrongiello e al., 2012). A summary page with risk scores in five areas related to drowning prevention was provided, as well as two tailored education handouts to parents.

Participants were approached in the patient exam room during their visit. Participants who satisfied the inclusion criteria were invited to participate in the pilot project after a description of the project was read to the participant. The participants were asked to take a baseline parent assessment risk survey and engage in a brief discussion with provided tailored education handouts. A follow-up parent assessment risk survey was emailed to participants three weeks after the baseline survey was complete the REDCap automated survey reminder system,

with two attempts/reminders sent one day apart to remind parents to complete the follow-up survey.

Inclusion and Exclusion Criteria

Participants included parents or legal guardians of children under five years old presenting to the Pediatric Emergency Department (PED) with a low acuity medical or injury complaint, at local children's hospital in Phoenix, Arizona, Parents were English speaking. Participants with a child presenting with a high-acuity medical or injury complaint, including children requiring urgent or immediate medical care, as well as healthcare needs requiring lifesaving treatment by emergency healthcare providers and staff were excluded. In addition, participants with children who were five years of age and older and non-English speaking were also excluded.

Data Collection

Participants, who satisfied the inclusion criteria, were invited to participate in evidence-based project after the project leader read a description of the project to the participant. Participants recruited completed the following forms: (a) consent form and (b) Health Insurance Portability and Accountability Act of 1996 (HIPAA) authorization form. After the senior injury prevention specialist obtained consent prior to the participants beginning the survey on the electronic tablet. Demographic questions included questions about gender, relationship to child, age, level of education, employment status, race/ethnicity, and age of the child. The participants entered a working email address in a free-text box and were required to supply this information before they could continue with the survey.

Baseline self-reported behaviors and knowledge assessment were measured using a 20-item risk assessment survey. The risk assessment survey was developed by the project leader

and reviewed by three field experts for content validity (see Appendix J). The survey was based on the Appraisal Statements Questionnaire (ASQ). Previous Cronbach alphas for the 3- and 4-item statements ranged from .82 to .85. This survey evaluated parents' self-reported behaviors and knowledge in five categories related to drowning risks, with four questions per category (Morrongiello et al., 2012). A Likert scale was used to evaluate survey responses and generate a risk score (Vagias, 2006).

The baseline risk assessment survey addressed five categories related to drowning risk behaviors including supervision practices, emergency preparedness, developmental milestones, life jackets, and pool parties. The survey took approximately 10-15 minutes for the participants to finish. Each response had an assigned point value from one to five. A maximum value of 20 was set for each of the five drowning risk categories, with a total possible risk score of 100. The highest risk was identified by the highest numerical value (McDonald et al., 2005; Morrongiello et al., 2012; Nansel et al., 2002).

The participant was given a summary page, which included a score for each category of drowning risk and a total risk score (Appendix K). The top two categories of drowning risk were identified and discussed with each participant using two tailored educational handouts based on self-reported behaviors. The perceived relevance of the tailored intervention and likelihood of behavior change were measured following the tailored discussion by a post intervention survey. A link to the follow-up risk assessment survey was emailed to the participants three weeks later. REDCap sent this survey link through the automated survey reminder system. A total of three reminders one day apart, were made to collect follow-up data and measure the additional outcome variables. At the completion of each interaction with the participants, the participants were given a neon-colored index card with information about the follow-up survey including the

email address they would receive the email from and the date they could expect to receive the email.

Data Analysis

Descriptive statistics were used to describe the sample and outcome variables. Inferential statistics was used to analyze the data. A two-tailed test was used and the critical value was set at $p < 0.05$. Further analyses were conducted using the Spearman's Correlation to examine the relationships between the risk scores in each of the five categories, the total risk score, parent age, education, employment, and the total number of children. In addition, an independent t-test was used to determine if the mean total risk score was significantly different between parent age, education, employment, and the total number of children.

Results

Demographics

The foundational studies for the development of this evidence-based project had a mean attrition rate of 18% (McDonald et al., 2005; Morrongiello et al., 2012; Nansel et al., 2002). The number of participants was considered based on this attrition rate. We anticipated recruiting 36 participants. A total of 29 participants agreed to complete the baseline risk assessment survey and participate in the tailored intervention. The average age of the sample was 29 years (M = 28.5; SD = 6.35) with the age range from 17 to 44 years of age. Twenty-six (88.7%) were the parent of a child under five years old; 25 (86.2%) of the participants were female; and 4 (13.8%) were male. Fifteen (51.7%) had a high school diploma or less education, 12 (41.4%) had some college or tech school training, and 2 (6.9%) were college graduates. Sixteen (55.2%) were employed 40 or more hours per week, 5 (17.2%) worked 39 hours or less, and 8 (27.6%) were unemployed. Nineteen (65.5%) of the participants were Hispanic, and 10 (34.5%) were non-

Hispanic. Fifteen (51.7%) reported having two children or less and 14 (48.2%) had three or more children. Demographic information is displayed in Appendix C.

Outcome variables

The project protocol and outcome measures guided the project team to collect baseline data on the relevance of the tailored intervention and the likelihood to make a behavior change. Data analysis was used to determine how tailored messaging was perceived and appropriate in this setting but due to a lack of follow-up response the effectiveness of the tailored intervention was not measured. Twenty-nine (100%) of the participants reported that the tailored intervention was relevant to their child. Twenty-seven (93%) reported a likelihood of behavior change when water safety education was tailored to their child (Appendix L). Knowledge retention and self-reported behavior change were not measured due to a lack of follow-up participant response. A moderate positive correlation exists between total number of children and milestones risk score, ($r_s(29) = 0.46$, $p = 0.01$). No other significant correlations exist between the risk scores and parent demographics. Correlation results are displayed in Table 1 (Appendix D). Life jacket use ($M = 9.3$, $SD = 2.7$) and emergency preparedness ($M = 9.6$, $SD = 2.9$) were identified as the top two categories with the highest risk score amongst the participants. Categories of drowning risk results are demonstrated in Figure 1 (Appendix E).

An independent t-test was conducted to compare the total risk score between parents less than 25 years old ($M = 43.6$, $SD = 11.6$) and parents 25 years and older ($M = 41.8$, $SD = 6.1$), $t(7)$, $p = 0.70$. An independent t-test was conducted to compare the total risk score and parents with two children or less ($M = 41.5$, $SD = 8.8$) and parents with three or more children ($M = 42.9$, $SD = 6.0$), $t(27)$, $p = 0.63$. An independent t-test was conducted to compare the total risk score and parents with less than a college degree ($M = 42.6$, $SD = 7.6$) and parents who graduated

college with at least a bachelor's degree (M = 37.5, SD = 3.5), t(27), p = 0.37. An independent t-test was conducted to compare the total risk score and unemployed parents (M = 41, SD = 9.2) and employed parents (M = 42.7 , SD = 6.9), t(27), p = 0.60. The t-test results are displayed in Appendix F.

Discussion

The purpose of the pilot project was to examine how parents can be persuaded to engage in behavior changes to reduce their child's drowning risk by using an assessment-based approach and providing tailored education. This evidence-based project gave parents an opportunity to self-report knowledge and behavior practices surrounding water safety. By using an assessment-based approach and identifying areas that increase a child's risk for drowning, the tailored intervention evoked a positive interaction and receptivity from parents. The results suggest parents are more likely to make a behavior change when water safety education is tailored and perceived as relevant to their child. Clinical populations vary considerably in terms of knowledge, behavior practices, and learning needs, and tailored education targets specific needs and exhibits effectiveness by offering a high level of perceived relevance to the recipient (Nansel et al, 2002).

The customized education was highly focused. Parents received information on the top two categories of drowning risk based on their responses. They engaged in an open discussion with the author about simple ways to keep their child safer at the pool. However, the effect of the intervention could not be fully tested due to the lack of follow-up and post data collection. Therefore, behavior change and knowledge improvement was not measured. The email approach for follow-up was a poor communication method for this convenience sample. It is undetermined why participants did not complete the post survey when they received it by email.

Life jacket use and emergency preparedness were identified as the top two categories with the highest risk core. These results suggest that there is a lack of understanding about the use of a lifejacket and what do in a drowning emergency. Certain life jackets are designed to prevent a drowning by keeping a child's head and face out of the water and in a vertical position. Life jackets should be properly fitted and continually sized as the child grows (USCG, 2019). Bystander cardiopulmonary resuscitation (CPR) can prevent a fatal drowning with proper technique and ventilation. Topjian and colleagues (2012) discuss drowning survival and how crucial effective CPR can be to prevent neurological deficits and ultimately, death.

No significant difference was found between parent demographics and total risk score. However, parents with an education level less than a college degree had a total risk score of 5.1 points higher than parents with at least a college degree. Low socioeconomic status has been found to be associated with parental unsafe injury-preventable behaviors, as well as undesired safety knowledge and beliefs (McDonald et al., 2005). The results in this project may be attributable to the parental knowledge gap concerning life jacket use and emergency preparedness.

Practice Implications and Future Research

Findings from this evidence-based project suggest using an assessment-based approach to tailor water safety information for parents with young children. However, due to the lack of post intervention data, it is unclear if a behavior change or knowledge retention took place. The design of this evidence-based project is quantifiable and replicable in a low-acuity setting. Phone calls and text messaging may be a more effective option to collect follow-up data. In the future, self-reported behavior change could be measured by a decrease in the total risk score from baseline to follow-up. Knowledge improvement could be measured by the self-reporting of

sharing the tailored education with others. Replication of this evidence-based project and intervention is realistic to further evaluate self-reported behavior change and knowledge improvement. Safety team members may consider implementing this intervention during the summer months, with a larger sample size, and utilizing an alternate method to collect follow-up data. Further, offering the risk assessment survey and tailored education in languages other than English may have a positive impact on the sample size, ability to collect post intervention data, and contribute to the generalizability of the results.

Limitations

There were several limitations to this evidence-based project, which are important to discuss for future research. Participants were asked to self-report behaviors and knowledge about water safety, as opposed to recording direct observations of their behaviors around a swimming pool. However, a majority of the behaviors were assessed by a level of appraisal of certain behavior practices and perceived danger of a given situation which only be measured by self-reporting. This project included a small convenience sample from a pediatric emergency room setting. While participating families presented with low acuity complaints and had no impingement of the care they received, it is unclear how their current situation factored into self-reporting behaviors. The exclusion criteria, which eliminated non-English speaking parents from recruitment, was also a limitation to this project because a large part of the population seen in this pediatric emergency room were Spanish-speaking. Lastly, a large limitation was the lack of follow-up response by use of emailing surveys. The effect of the intervention was not determined due to lack of post intervention survey data collection.

Conclusion

This evidence-based project demonstrates that tailored water safety education is a

promising way to educate and communicate with families about water safety. Parents reported a high likelihood of behavior change when water safety education was tailored and relevant to their child. The tailored intervention evoked positive interaction and receptivity from parents and suggested a high motivation to make a behavior change. However, the effect of the intervention could not be tested due to the lack of participant response to the follow up email survey. The design of this evidence-based project is quantifiable and replicable in a low-acuity setting. Future delivery of the intervention should use an alternative method to measure self-reported behavior change and knowledge improvement.

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Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Nansel, T.R. (2002). Baby, Be Safe: The effect of tailored communications for pediatric injury prevention provided in a primary care setting. **Country:** United States (Washington, DC) **Funding:** not reported **Bias:** sample bias	Health Belief Model	**Design:** two-group RCT **Purpose**: to determine effectiveness of tailored communications for promoting adoption of child injury prevention measures by parents	N = 174 IG: n = 85 (tailored) CG: n = 89 (generic) **Demographics:** Respondents M, Ethnicity AA: 84.7% M % Mothers: 76.3% **Setting:** pediatric clinic **Inclusion:** parents of children 6-20 months of age at time of well visit **Attrition:** 18.3% (lost to FU)	**IV:** computerized tailored messaging **DV**: FU injury risk score **Time frame**– Assessment questions 10-15 minutes FU phone assessment 3 weeks post intervention	Overall risk score based on 5-item-psychosocial construct for injury-related locus of control α = 0.58 ↓ valid/reliable	ANCOVA (↑ sensitivity of main effects)	**DV** IG: M ↓ in score: 4.68 SD = 6.44 T = -3.45 df = 1 p = 0.01 (↓risk score for IG)	**LOE**: II **Strength:** RCT design; time-efficient; feasible; ease of development into practice; moderate attrition rate **Weakness:** self-reporting; convenience sample; primarily African-American parents; sampling limitation; many disconnected phone numbers; limited validity/reliability for measurement tool **Conclusion:** tailored messaging is an effective way to provide injury prevention education to parents of young children **Clinical significance:** cost efficient, tailored education program for parents to discuss injury prevention behaviors with their provider, which is easily integrated within regular patient flow in the primary care setting

Appendix A

Evaluation Table

Table 1

Final yield from literature search.

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
McDonald, E.M. (2005). Evaluation of kiosk-based tailoring to promote household safety behaviors in an urban pediatric primary care practice **Country:** United States **Funding:** National Center for Injury Prevention and Control **Bias:** possible social desirability bias at FU	Elaboration Likelihood Model	**Design:** 2-group RCT **Purpose:** describe development and feasibility of implementing computer-tailored injury prevention intervention in busy urban primary care practice; report results of program's impact on parent' home and child passenger safety knowledge, beliefs, and behavior	N = 144 IG: n = 70 (tailored feedback report) CG: n = 74 (no feedback) **Demographics:** MA, mo. (child) 9.38 MA, y (mother) 26 Mother education HS: 74% E, AA children: 94% **Setting:** urban hospital-based academic primary care practice **Inclusion:** parents of children between ages 6wks and 24 mo. Under care of participating MD, English-speaking, living in same home as child **Attrition:** 16% (lost to FU)	**IV:** kiosk-based tailoring intervention **DV1:** safety knowledge **DV2:** prevention beliefs **DV3:** safety behaviors (overall risk score) **Time frame of the intervention-** 14- minutes to complete assessment FU phone assessment 4 weeks post intervention	Risk index calculation (r/v tool for risk behavior)	X^2 or Fisher's exact *t*-test	**DV1** **IG, CG** Front seat Car safety: 5%, 16% $p < 0.05$ No stair gate needed: 3%, 14% $p < 0.05$ Ipecac for poisons: 57%, 39% $p < 0.05$ (↑ knowledge on safety items in IG) **DV2** **IG, CG** Believe injuries r/t supervision: 73%, 93% $p < 0.05$ child belief of own safety: 25%, 45% $p < 0.05$ teach to obey parent for IP: 64%, 86% $p < 0.05$ (↑ + IP beliefs in IG) **DV3** IG: 51 (20-90%) CG: 44 (11-70%) $p = 0.01$ (↑ % correct in IG)	**LOE:** II **Strength:** RCT design; provides evidence to support future efforts of computer tailoring; moderate attrition rate **Weakness:** small pilot study; self reporting; "one-shot" intervention (one visit); baseline assessment may have influenced subsequent behavior; validity/reliability of tools not reported **Conclusion:** the kiosk intervention resulted in more safety knowledge, positive prevention beliefs, and selected safety behaviors. Overall risk score in IG was significantly better. **Clinical significance:** tailored communication is widely accepted by parents and providers and can be incorporated into a busy clinical setting.

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Carlson-Gielen, A. (2007). Using a computer kiosk to promote child safety: Results of a randomized, controlled trial in an urban pediatric emergency department **Country:** United States **Funding:** National Institute of Child Health and Human Development; subcontract to the Health Communication Research Laboratory at St. Louis University **Bias:** possible overestimation of safety behaviors	Elaboration Likelihood Model & Precaution Adoption Process Model	**Design:** RCT **Purpose:** to evaluate theory-based, computer-tailored intervention designed to promote parents' car seat, smoke alarm, and poison storage safety knowledge and behaviors	N = 901 IG: n = 448 CG: n = 453 **Demographics:** Child's age, y 1-2: 42% Gender m/f = 50% Respondents Mother's: 90% 20-29: 55.3% AA: 93% HS degree: 75% PCI: < $5K: 63% **Setting:** ED of level 1 pediatric trauma center in Baltimore City **Inclusion:** parents of children between 4 and 66 months c/o injury or medical issue, English-speaking, living in Baltimore City, living with child at least halftime. parent/guardian **Exclusion:** parent of child whose visit was suspicious of child abuse or neglect, critically ill or injured **Attrition:** 16% (lost to FU)	**IV1:** computer kiosk tailored report **IV2:** per capita income **DV1:** knowledge outcomes **DV2:** behavioral outcomes for LE & HE [1]CSS use [2]SA use [3]PS **DV3:** Parent Anxiety **Time frame of the intervention-** 12-minute assessment FU phone assessment one month post intervention	Multiple choice; T/F; interview questions Staging algorithms (r/v not tested but recommended use in predicting behavior stages) State- Trait Anxiety Inventory ($\alpha = 0.86$)	Sample t- test Ordinal and logistic regression analyses- for IG to compare behavioral outcomes & per capita income as IV	**IV1 & DV1: answered correct, M ± SD** IG: 72.6 ± 13.9 CG: 66.4 ± 14.8 t = 5.87 p = .000 **IV1 & DV2:** OR (95% CI),p EA for IG **LE** [1]1.15 (0.85-1.54 p > 0.05 [2]0.95 (0.63-1.42) p > .05 [3]0.77 (0.54-1.11) p > .05 **HE** 1.70 (1.20-2.41) p = .003 2.07 (1.16-3.69) p = .01 2.01 (1.27-3.16) p = .003 **IV2 & DV2: (IG)** **LE,LI** [1]0.96 (0.66-1.39) p > .05 [2]0.72 (0.43-1.21) p > .05 [3]0.91 (0.57-1.44) p > .05 **LE,HI** [1]2.09 (1.28-3.40) p = .003 [2]1.27 (0.63-2.59) p > .05 [3]0.72 (0.41-1.28) p > .05 **HE,LI**	**LOE:** II **Strength:** focus on preschool-aged population; use of stage-based behavior change theory; application of PAPM to child safety and computer-tailored interventions; RCT design; reasonable cross- section of families; large sample of families; same time spent on computer kiosk in both groups **Weakness**: self-reporting; majority of mother respondents **Conclusion:** improvements in safety knowledge, short term behavior outcomes, and correct safety reporting behaviors; injury prevention programs in ED setting can be offered to wide spectrum of families; financial barriers for low-income families are a priority for correct safety behaviors **Clinical significance:** results showed minimal intrusion to patient flow or time with provider and computer technology for patient education can be applied to busy EDs and other clinical settings.

							[1]1.08 (0.68-1.72) p > .05 [2]1.80 (0.83-3.91) p > .05 [3]2.70 (1.42-5.11) p = .002 **HE,HI** [1]3.28 (1.94-5.54) p = .000 [2]1.90 (0.81-4.48) p > .05 [3]1.81 (0.94-3.45) p > .05 **DV3: M ± SD** IG: 34.94 ± 10.25 CG: 34.96 ± 11.35 p > .05	

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Nansel, T.R. (2007). Preventing unintentional pediatric injuries: A tailored intervention for parents and provider **Country:** United States **Funding:** Intramural Research Program of the National Institutes of Health, National Institute of Child Health and Human Development **Bias:** potential social desirability reporting bias among providers or parents	Health Belief Model	**Design:** controlled trial w/o random **Purpose:** to determine efficacy of delivering T-IPI to parents and concurrent T-IPI to parents and physicians on adoption of safety practice	N = 594 IG1: n = 192 IG2: n = 221 CG: n = 188 (G-IPI) **Demographics:** M % age range, y (parents) 21-25: 35.6% M % Home owners: 29.8% M % education College: 41.9% HS: 44.5% M % Ethnicity Non-AA: 10% AA: 58.7% M % Income < $10k: 41.2% **Setting:** Midwestern pediatric clinic **Inclusion:** parents of children age 4 and younger attending well-child visit **Attrition:** 49% (lost to FU)	**IV1**: T-IPI only **IV2:** T-IPI + P **IV3:** education level **DV1:** provider-parent communication **DV2:** parental adoption of injury prevention behaviors **DV3:** participant reactions to information **Time frame of the intervention-** FU phone assessment one month post intervention	Computer kiosk assessment questions Nine-item scale- assess persuasiveness of intervention ($\alpha = 0.97$)	Descriptive statistics, multinomial logistic regression, chi-square analyses, ANOVA	OR (95% CI) **IV1 & DV1** n = 34.6% 1.2 (0.6-2.1) p > 0.05 **IV2 & DV1** n = 28% 0.9 (0.5-1.6) p > 0.05 **IV1 & DV2** n = 48.6% 2.0 (1.1-3.6) p < 0.05 **IV2 & DV2** n = 45% 1.9 (1.0-3.4) p < 0.05 **IV1,IV2 & DV3 (persuasiveness rating)** M = 8.4, 8.5; F = 1.31 df = 2 p = 0.27 **IV3 & DV2** **< HS & HS =** T-IPI: p = 0.02 (↑ effectiveness c/w CG)	**LOE:** III **Strength:** lower socioeconomic status sample **Weakness:** low FU response rate (overall decrease in response to phone surveys); reduced statistical power; large attrition rate **Conclusion:** tailored approach with targeted information may overcome impediments of generic-printed injury prevention information; addition of provider-directed tailored feedback did not enhance intervention effectiveness **Clinical significance:** potential enhancement of injury prevention anticipatory guidance to increase safety practices by parents with young children

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Morrongiello, B.A. (2012). A randomized controlled trial evaluating the impact of the supervising for home safety program on parent appraisals of injury risk and need to actively supervise. **Country:** United States **Funding:** grants from the Social Science & Humanities Research Council of Canada and the United States Department of Health and Human Services, Centers for Disease Control, National Center fro Injury Prevention and Control **Bias:** sampling bias; self-reporting scores-post intervention	Health Belief Model	**Design:** RCT **Purpose:** To evaluate the efficacy of the Supervising for Home Safety program for increasing parental injury-risk appraisals and need to actively supervise 2- through 5- year old children	N =163 IG – n = 81 CG- n = 82 **Demographics:** MA, mo. - child m: 44.79 f: 44.21 Mother education % college: 63.80% Father education % college: 66.25% Family PCI >$80k: 64.50% **Setting:** laboratory **Inclusion: c**hild 2-5years old, child/parent fluent in English, older sibling at least 2 years older than target child, mother agreed to be participating parent **Exclusion:** reported abnormal child development, twins, participation in pilot projects related to study **Attrition:** 6.4% (lost to FU)	**IV:** tailored safety video **DV1:** ASQ scores for six subscales [1]Vulnerability [2]Severity [3]Preventability [4]Supervision [5]Self-efficacy [6]knowledge **DV2**: barriers to supervision **Time frame of the intervention** – 20-minute video FU assessment 4 months post intervention	ASQ subscales (M alpha = 0.83)-reliable/valid tool	ANOVA- sample demographics Split-plot ANOVA- intervention impact Split-plot ANOVA- types of barriers to supervision & FU w/ Bonferroni	$p > .05$ (randomization effective) **IV1 & DV1** 3-way interaction of Group x Appraisal x Time, $F(10, 1610) = 2.20$, $p < .05$, partial $n^2 = .19$ Pre & Post Intervention (Intermediate/1-year) Appraisals x Time, $F(5, 800) = 3.58$ and 6.35, $p < .01$ ↑ appraisal scores-immediate and 1-year (persistent effects) **IV & DV2** Barrier type reported $F(3,258) = 30.65$ $p < .01$ Environment/location (↑ reporting) M = .52 SD = .35 $p < .05$	**LOE:** II **Strength:** RCT design; parental inquire on identifying barriers; minimal bias; low attrition rate **Weakness:** mostly Caucasian sample, majority of mothers participating; multiple intervention components **Conclusion:** tailored video messaging improves supervision practices by identifying different risk appraisals that motivate different types of safety behaviors, depending on parental supervision needs/experiences **Clinical significance:** safety behavior changes using this approach is sustainable and better retained by parents

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Shields, W. (2013). Utilizing the pediatric emergency department to deliver tailored safety messages: Results of a randomized controlled trial **Country:** United States (Baltimore, MD) **Funding:** grant to Johns Hopkins Bloomberg School of Public Health from the National Institute of Child Health and Human Development **Bias:** none reported	Precaution Adoption Process Model	**Design:** RCT **Purpose:** to evaluate impact of computer kiosk intervention on parents' self-reported safety knowledge and observed behaviors; compare self-reported versus observed behaviors	N = 901 IG: n = 448 (tailored report) CG: n = 453 (generic report) **Demographics:** Age range, y (child) 1-2 y: 42% m: 51% **Respondents** AA: 93% Mothers: 90% Not married: 69% 20-29 y: 55% HS: 74% annual PCI- < $5K: 63% **Setting:** pediatric trauma ED **Inclusion:** ESP, child between 4-6 months c/o treatment for injury or medical complaint, live in Baltimore **Exclusion:** parents of critical patients, parents of children with suspected child abuse/neglect **Attrition:** 20% (lost to FU)	**IV:** tailored safety computer program **DV1**: safety knowledge **DV2**: self-reported safety behaviors **DV3:** observed safety behaviors **Time frame of intervention –** 10-12 minute assessment FU completed 2-4 weeks and 4-6 months post intervention	Multiple choice and T/F questions PAPM-stage based questions (r/v not tested but recommended use in predicting behavior stages)	t-tests (total M % correct scores) ordinal regression & logistic regression PPV and NPV & Fisher's exact test	**DV1** Total M % correct IG: 73.08 (13.6) CG: 69.41 (14.08) t = 3.54 p = 0.000 ES = 0.26 (IG ↑ % correct) **DV2** (IG,CG) OR=1.36; 95% CI=1.05, 1.77 p = .02 (IG in ↑ PAPM stage) **DV3** IG, CG (smoke alarms) PPV: 33%, 54% p = .09 NPV: 23%, 66% p = .06 (over-reported unsafe behaviors) IG, CG (poison storage) PPV: 16%, 14% p = 1.0 (under-reported unsafe behaviors) NPV: 100%, 100% p = 1.0	**LOE**: II **Strength:** home observation of safety behavior; RCT design; high FU rate; direction observation; reasonable cross sample of conditions; strong sample size **Weakness:** self-reporting; car seat observations not possible **Conclusion:** improved safety knowledge scores and increasing self-reported behaviors due to intervention; consistent knowledge gains evident after four months on computer tailoring home safety information **Clinical significance:** results are encouraging for clinical settings as they were achieved without burdening providers

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Gittelman, M.A. (2014). A computerized kiosk to teach injury prevention: Is it as effective as human interaction? **Country:** United States (Cincinnati, OH) **Funding:** Ohio Department of Public Service-EMS Injury Prevention Research Grant **Bias:** low- convenience sampling	Elaboration Likelihood Model	**Design:** Prospective, randomized trial **Purpose:** determine if computerized kiosk in Pediatric ED can screen families for injury risk, encourage to make more safety changes at FU compared to IPS	N = 317 KB-G: n = 172 IPS-G: n = 145 **Demographics** P/G MA: < 35y: 64% E (child) white: 62.8% f (child): 49.8% mother taking survey: 91.2% HS grad or lower: 34.4% Age range, y (child enrolled) 1-4y: 36.3% **Setting:** CCHPC ED **Inclusion:** parent/legal guardian w/ child between ages birth through 14y with c/o urgent/nonurgent **Exclusion:** parents of critically ill or emergent child, non-English speaking, no parent/guardian present at time of visit **Attrition:** 31% (lost to FU)	**IV1:** KB injury instructions **IV2:** IPS instructions **DV:** change in % of M correct behavior responses per age **Time frame of the intervention given:** KB-G completed in 6 minutes IPS-G completed in 8 minutes FU completed 3 weeks after intervention	Survey questions based on AAP TIPP program ($\alpha = 0.869$) reliable and valid survey	X^2 Analysis (categorical variables) Student's *t* test (continuous variables)	**IV1, IV2 & DV** **<1 y** 2.95 (7.83), 7.65 (10.16) p = 0.144 **1-4 y** -0.45 (9.92), 7.59 (8.74) p = 0.0002 **5-9 y** 2.58 (8.13), 9.82 (9.04) p = 0.002 **10-14 y** 0.37 (9.36), 8.44 (6.14) p = 0.003 **Overall change in % for DV** IV1: 1.05 (9.04) IV2: 8.31 (8.62) p < 0.0001	**LOE:** II **Strength:** kiosk screening time was short; families satisfied with service **Weakness:** convenience sampling, parents only approached when CRCs available; IPS employed at ED safety resource center; KG practiced safer behaviors at initial kiosk screen; self-reporting; modest attrition rate **Conclusion:** computerized kiosk in ED waiting room appropriate place to screen for child safety risk, but would be more effective if printed information was reviewed and given by provider (human being) **Clinical significance:** kiosk screening is quick and provides useful information for decrease injury risk and would be more beneficial if information was discussed with provider

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Van Beelen, M.E.J. (2014). Effectiveness of web-based tailored advice on parents' child safety behaviors: Randomized controlled trial **Country:** Netherlands **Funding:** grant from ZonMw, the Netherlands Organization for Health Research and Development **Bias:** none reported	Health Belief Model	**Design:** RCT **Purpose:** to evaluate effectiveness of E-Health4Uth home safety on parents' safety behaviors with regard to prevention of falls, poisoning, drowning and burns	N = 1292 IG – n = 643 (WB w/ personal counseling) CG- n = 649 (generic) **Demographics:** **Mother** 93.58% MA, y: 32.06 Low education: 15.19% Employed: 83.44% E, Dutch: 88.46% **Father** MA, y: 34.51 Low education: 22.4% Employed: 95.67% E, Dutch: 87.94% **Children** M: 51.32% MA, mo.: 7.21 **Setting:** well-baby clinics **Inclusion:** parents with child between 5-8 months old and eligible for routine well-baby visit **Attrition:** 6.6% (lost to follow-up)	**IV:** web-based tailored safety advice w/ personal counseling **DV:** unsafe behavior (total risk score at FU) **Time frame of the intervention given –** FU conducted 10 months post intervention	total risk score (max score 53 points- r/v tool for risk behavior)	Logistic (for specific safety behaviors & Linear regression (total risk score) analyses	**DV** IG: M = 13.63 SD = 6.12 (1.00-3.00) CG: M = 15.34 SD = 6.07 (0.00-37.00) OR -1.59, 95% CI -2.26 to -0.93 (IG with significant ↓ in total risk score)	**LOE:** II **Strength:** focus on effect of tailored intervention on parents' child safety behaviors and overall safety risk score; RCT design; large number of participants; few lost to FU **Weakness:** intervention not tested on mobile and tablet devices; potential recall bias from gift vouchers; self-report behavior may lead to underestimation **Conclusion:** use of tailored parent information combined with counseling from provider is effective in promoting parents' child safety behavior **Clinical significance:** supports the use of web-based, tailored, safety advice for injury prevention in pediatric health care setting

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Glassman, T.J., (2017). A social marketing intervention to prevent drowning among inner-city youth **Country:** U.S. Midwest **Funding:** grant from the Center for Injury Research and Policy funded by CDC **Bias:**	Health Belief Model	**Design:** quasi-experimental-matched pairs **Purpose:** determine if social marketing campaign guided by HBM could improve parent's knowledge and perceptions concerning water safety, overall improve adult supervision	N = 65 IG: n = 39 (swim lessons/messages) CG: n = 26 (no swim lessons or messages) **Demographics:** MA- mother: 43y MA- child: 9y E (AA) – 78% **Setting:** inner-city swimming course **Inclusion:** parent/guardian of inner-city youth, enrolled in 6-week session swimming course **Attrition:** not reported	**IV:** social marketing intervention **DV1:** perceived threat **DV2**: perceived benefit **DV3**: perceived barrier **DV4:** self-efficacy **DV5:** behavioral intention **DV6:** knowledge **Time frame of the intervention** – **IG:** 6-weeks **CG:** 3 weeks	Structural survey questionnaires- 35 items using Likert-type scales (α = .70 to .83) (r/v tool)	Chi-square analysis (parent perception of child swimming ability); Two-way analysis of covariance Multivariate linear regression	X^2 = 10.985; p = .012 ANCOVA: n^2; F **ME/post (DVs)** [1]0.004; 0.202 [2]0.001; 0.09 (p<.05) [3]0.000; 0.019 [4]0.078; 4.543 (p<.05) [5]0.049; 0.964 [6]0.272; 20.207 (p<.001) **IE (DVs)** [1]0.007; 0.365 [2]0.001; 0.173 [3]0.000; 0.012 [4]0.071; 4.133 (p<.05) [5]1.250; 0.644 [6]0.123; 7.594 (p<.05) **Model R^2 (DVs)** [1].504 [2].266 [3].189 [4].364 [5].100 [6].561 **DV5** R^2 = 0.336, F(1, 60) = 9.09, p < .01 **DV1** β = .525, p = .00	**LOE:** III Strength: study consistent with extant literature **Weakness**: majority of female participants; low participation; social desirability **Conclusion:** increase in parent/guardians' knowledge and self-efficacy on water safety, correctly identified risk factors associated with drowning **Clinical significance:** providers can use these results to develop feasible strategies (prevention messages to supplement swim lessons and decreasing drowning rates among at-risk youth.

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied	Measurement of data	Data analysis	Findings	Decision to use in practice
Omaki, E. (2017). A systematic review of technology-based interventions for unintentional injury prevention education and behavior change **Country:** United States **Funding:** National Institutes of Health, National Institute of Child Health and Human Development **Bias:** low-risk due to possible social desirability or recall bias	Elaboration Likelihood Model	**Design:** Systematic review **Purpose:** summarize evaluation of computer and mobile-technology-based health behavior change applications in unintentional injury prevention; describe how successes can be applied to injury-prevention programs; identify research gaps	N = 44 technology-based IP studies (RCTs n = 30) **Demographics:** Pediatric IP programs: 24 **Setting:** n/a **Inclusion:** CB interventions, program evaluations-delivered by computer processor; studies that addressed unintentional injury prevention **Exclusion:** educational videos, computer-only data collection **Attrition:** 0	**IV:** computer-and-mobile-technology-based interventions **DV1**: knowledge impact **DV2:** behavior impact [1]Observed [2]Reported **Time frame of electronic searches-** article search published since 1990; eligible studies published in 2002 or later	DVs based on Target population Categorized study types Bias risk assessment	Data abstraction form	24 studies designed for Pediatric IP 5 study types identified [1]LHSP – 16 [2]KB programs – 4 [3]RHIP – 11 [4]MT/PD – 2 VR – 11 **BRA:** 15 studies scored ≥ 20 **DV1** Y – 20 No – 1 N/A – 23 **DV2** Total N/A – 7 [1]Observed Y – 19 No – 3 [2]Reported Y – 11 No – 3	**LOE**: I **Strength:** several strong RCTs commonly used **Weakness:** relevant articles missed in search or excluded erroneously during review; English-speaking only articles used, no translator resources for foreign articles **Conclusion**: review provides evidence on computer-based programs and effectiveness in conveying safety information and positively influencing injury prevention and safety behaviors **Clinical significance:** providers have increased potential for use of computer-based programs for IP education

AA – African American**, AAP –** American Academy of Pediatrics**, ANCOVA –** analysis of covariance, **ANOVA –** analysis of variance, **ASQ** – American Society for Quality, **BCT –** Behavior Change Theory**, BRA –** bias risk assessment, **CBA –** controlled before and after studies, **CCHPC ED** – Cincinnati Children's Hospital Medical Center Emergency Department, **c/w** – compared with, **CB** – cognitive behavioral, **CB/MT** – computer-and-mobile based technology intervention, **CDC** – Centers for Disease Control and Prevention, **CG** – control group, **CI** – confidence interval, **c/o** – complaint of, **CSS** – child safety seat use, **df** – degrees of freedom, **DV** – Dependent variable, **E** – ethnicity, **EA** – exposure analysis, **ED** – emergency department, **ELM** – Elaboration Likelihood Model, **ES** – effect size, **ESP** – English-speaking parents, **f** – female, **FU** – follow up, **G-IPI** – generic injury prevention information, **HB** – hospital-based, **HBM** – Health Belief Model, **HE** – high exposure, **HI** – high income, **HS** – high school degree, **HS =** - high school degree/equivalent, **IE** – interaction effect, **IG** - Intervention group, **IG1** - Intervention group1, **IG2** - Intervention group2, **IP** – injury prevention, **IPS** – injury prevention specialist, **ITT** – intent-to-treat, **IV** - Independent variable, **KB** – kiosk-based, **KG** – kiosk group, **LE** - Low exposure, **LI** – low income, **LHSP** – locally hosted software program, **LOE** – level of evidence, **m** – Male, **M** –Mean, **MA** – mean age, **mo** – months, **ME** – main effect, **MT/PD** – mobile technology and portable device, **N** – Sample (population), **NPV** – negative predictive value, **OR** – odds ratio, **n** – Sample size (studies), **N/A** – not assessed/available, **NR** – not reported, **PAPM** – Precaution Adoption Process Model, **P/G** – parent/guardian, **PCI** – per capita income, **PPV** – positive predictive value, **PS** – poison storage, **QE** – quasi experimental**, r/v** – reliability and validity, **Race** – race, **RCT** – Randomized Controlled Trial, **RHIP** – remotely hosted internet program, **S** – swimming, **SA** – smoke alarm use, **SD** – standard deviation, **SR** – systematic review**, T/F** – true/false, **T-IPI** – tailored injury prevention information, **T-IPI + P-** tailored injury prevention information plus supplementary tailored provider information, **TIPP** – The Injury Prevention Program, **TM** – tailored messaging, **VR** – virtual reality program, **w/o** – without, **WB** - web-based tailored safety advice, **y** – years, **Y** - yes

Appendix B

Synthesis Table

Table 1.

Review of literature and evidence synthesis table.

Author	**Carlson-Gielen**	**Gittelman**	**Glassman**	**McDonald**	**Morrongiello**	**Nansel**	**Nansel**	**Omaki**	**Shields**	**Van Beelen**
Year	2007	2014	2017	2005	2012	2002	2007	2017	2013	2014
Design	RCT	RCT	QE	RCT	RCT	RCT	RCT	SR	RCT	RCT
Level of evidence	II	II	III	II	II	II	II	I	II	II
Number of subjects/studies	901	317	65	144	163	174	594	44 studies	901	1292
Theoretical Framework	ELM & PAPM	ELM	HBM	ELM	HBM	HBM	HBM	BCT	PAPM	HBM
Setting										
Pediatric clinic				X		X	X			X
Swimming course			X							
ED	X	X							X	
Laboratory					X					
Demographics										
↑ % Mother respondents	X	X				X			X	
↑ % Low income (<$10k)	X					X			X	
↑ % African American parents			X			X	X		X	
↑ % HS degree or lower	X			X			X			X
↑ % 20-29 M age range, y- P/G	X			X			X		X	
Pediatric IP programs								X		
Child age, y (under 5)	X	X		X	X		X		X	X
Independent Variables										
Computerized TM	X					X			X	
Kiosk-based TM		X		X						
T-IPI only							X			
T-IPI + P							X			
Video-based TM					X					
IPS instructions		X								

Web-based TM										X
Social marketing			X							
Computer/Mobile technology								X		
Dependent Variables										
Knowledge impact	X		X	X				X	X	
Behavior impact- Observed								X	X	
Behavior impact- Self- report	X			X			X	X	X	
Provider-parent communication							X			
Provider-parent communication							X			
Parent perception			X							
Participant reactions to information							X			
ASQ scores					X					
Barriers to supervision					X					
Change in % of M correct behavior responses per age		X								
FU injury risk score						X				
Anxiety scores	X									
Findings										
Tailored > Generic	X	X		X	X	X		X	X	
Tailored w/ provider > Tailored w/o provider			X				X			X

AA – African American**, AAP –** American Academy of Pediatrics**, ANCOVA –** analysis of covariance, **ANOVA –** analysis of variance, **ASQ** – American Society for Quality, **BCT –** Behavior Change Theory**, BRA –** bias risk assessment, **CBA –** controlled before and after studies, **CCHPC ED** – Cincinnati Children's Hospital Medical Center Emergency Department, **c/w** – compared with, **CB** – cognitive behavioral, **CB/MT** – computer-and-mobile based technology intervention, **CDC** – Centers for Disease Control and Prevention, **CG** – control group, **CI** – confidence interval, **c/o** – complaint of, **CSS** – child safety seat use, **df** – degrees of freedom, **DV** – Dependent variable, **E** – ethnicity, **EA** – exposure analysis, **ED** – emergency department, **ELM** – Elaboration Likelihood Model, **ES** – effect size, **ESP** – English-speaking parents, **f** – female, **FU** – follow up, **G-IPI** – generic injury prevention information, **HB** – hospital-based, **HBM** – Health Belief Model, **HE** – high exposure, **HI** – high income, **HS** – high school degree, **HS = -** high school degree/equivalent, **IE** – interaction effect, **IG -** Intervention group, **IG1 -** Intervention group1, **IG2 -** Intervention group2, **IP** – injury prevention, **IPS** – injury prevention specialist, **ITT** – intent-to-treat, **IV -** Independent variable, **KB** – kiosk-based, **KG** – kiosk group, **LE -** Low exposure, **LI** – low income, **LHSP** – locally hosted software program, **LOE** – level of evidence, **m** – Male, **M** –Mean, **MA** – mean age, **mo** – months, **ME** – main effect, **MT/PD** – mobile technology and portable device, **N** – Sample (population), **NPV** – negative predictive value, **OR** – odds ratio, **n** – Sample size (studies), **N/A** – not assessed/available, **NR** – not reported, **PAPM** – Precaution Adoption Process Model, **P/G** – parent/guardian, **PCI** – per capita income, **PPV** – positive predictive value, **PS** – poison storage, **QE** – quasi experimental**, r/v** – reliability and validity, **Race** – race, **RCT** – Randomized Controlled Trial, **RHIP** – remotely hosted internet program, **S** – swimming, **SA** – smoke alarm use, **SD** – standard deviation, **SR** – systematic review**, T/F** – true/false, **T-IPI** – tailored injury prevention information, **T-IPI + P-** tailored injury prevention information plus supplementary tailored provider information, **TIPP** – The Injury Prevention Program, **TM** – tailored messaging, **VR** – virtual reality program, **w/o** – without, **WB -** web-based tailored safety advice, **y** – years, **Y -** yes

Appendix C

Demographics

Table 1.

Parent demographics

Parent Demographics	N	Percent
Relationship to child		
Parent	26	89.7
Legal Guardian	3	10.3
Gender		
Female	25	86.2
Male	4	13.8
Age		
<25 years	7	25.9
25 years and older	20	74.1
Age not provided	2	**
Education		
< High School	6	20.7
High School or GED	9	31
Some college/tech school	12	41.4
College graduate	2	6.9
Employment		
40+ hours per week	16	55.2
1-39 hours per week	5	17.2
Not employed	8	27.6
Ethnicity		
White	2	6.9
Hispanic	19	65.5
African American	2	6.9
Other	6	20.6
Total # of children		
2 or less	15	51.7
3 or more	14	48.2

Appendix D

Correlation Table

Table 1.

Correlation results between the risk scores and parent demographics.

Risk Scores	Milestones	Pool Party	Supervision	Life Jacket	Emergency Preparedness	Total Risk Score
Parent age	.10	-.07	.13	.11	-.01	.10
Education	-.28	-.24	.12	-.02	-.13	-.20
Employment	-.18	-.11	.16	.06	.03	-.03
Total # of children	.42*	.20	-.05	-.15	-.08	.14

Correlation is significant at the 0.01 level (2-tailed)**
Correlation is significant at the 0.05 level (2-tailed)*

Appendix E

Categories of Drowning Risk

Table 1**.**

Categories of drowning risk results.

	Milestones	**Pool Party**	**Supervision**	**Life Jacket**	**Emergency Preparedness**
Mean	9.0	7.0	7.2	9.3	9.6
SD	3.5	1.4	2.1	2.7	2.9

Appendix F

Independent t-test for Total Risk Score and Parent Demographics

Table 1.

Independent t –test: Total Risk Score and Parent Age

	Parent age	N	Mean	Std. deviation
Total risk score	<25 years old	7	43.57	11.57
	25 years old +	20	41.75	6.09

	Levene's test for equality of variances		t-test for equality of means				
						95% CI	
		Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Total risk score	Equal variances not assumed	.008	.534	7.196	.702	-8.952	12.595

$p < .05$

Table 2.

Independent t-test: Total Risk Score and Total Number of Children

	Total # of Children	N	Mean	Std. deviation
Total risk score	2 children or less	15	41.53	8.806
	3 children or more	14	42.93	6.044

	Levene's test for equality of variances		t-test for equality of means				
						95% CI	
		Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Total risk score	Equal variances assumed	.150	-.494	27	.625	-7.192	4.402

$p < .05$

Table 3.

Independent t-test: Total Risk Score and Education Level

	Education level	**N**	**Mean**	**Std. deviation**
Total risk score	< college graduate	27	42.56	7.633
	college graduate	2	37.50	3.536

	Levene's test for equality of variances		t-test for equality of means				
						95% CI	
		Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Total risk score	Equal variances assumed	.391	.917	27	.367	-6.253	16.364

$p < .05$

Table 4.

Independent t-test: Total Risk Score and Employment

	Employment	**N**	**Mean**	**Std. deviation**
Total risk score	Not employed	8	41.00	9.243
	employed	21	42.67	6.931

	Levene's test for equality of variances		t-test for equality of means				
						95% CI	
		Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Total risk score	Equal variances assumed	.345	-.528	27	.602	-8.144	4.810

$p < .05$

Appendix G

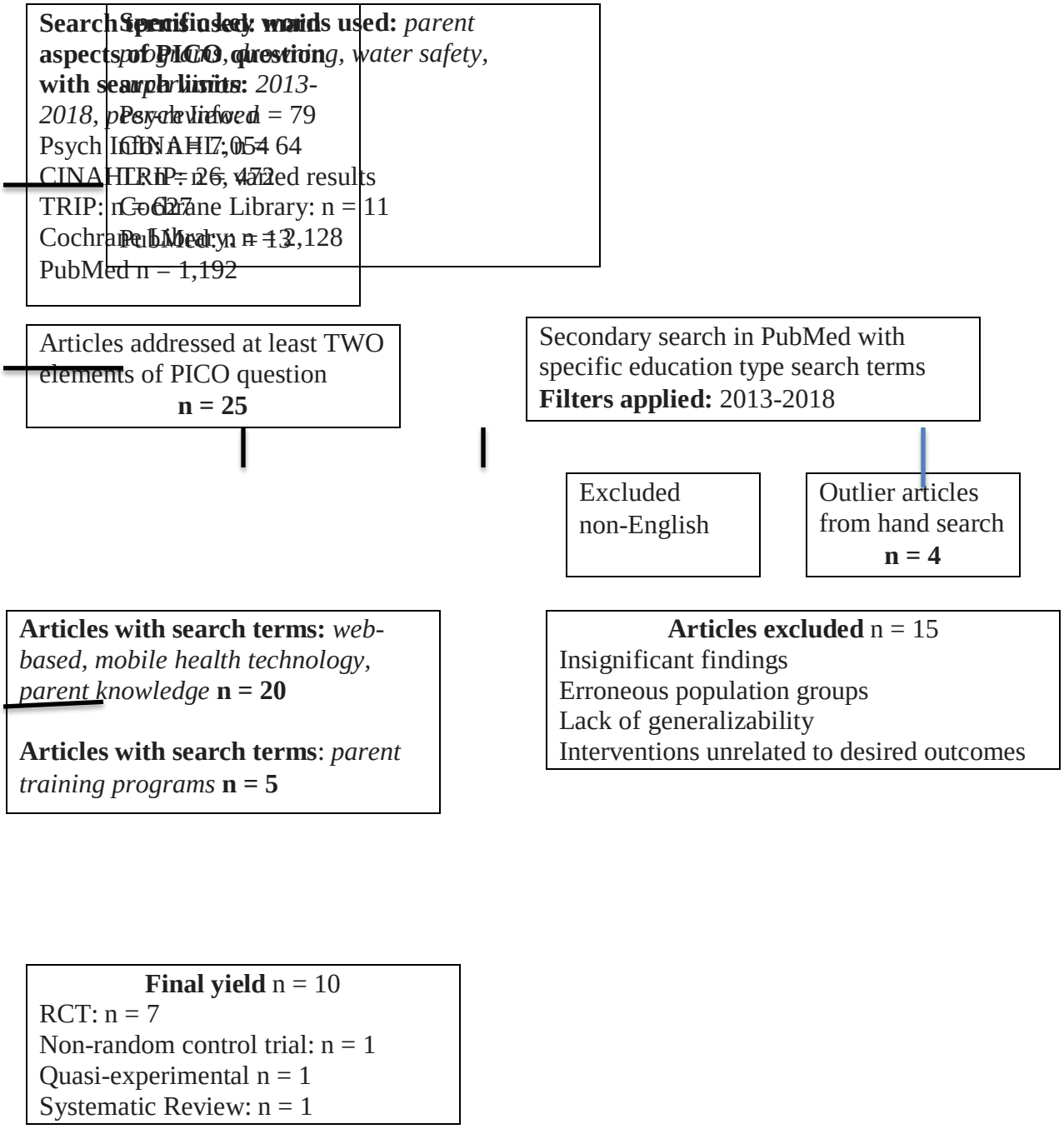


Figure 1. Flow chart detailing process of article search strategy and selection.

Appendix H

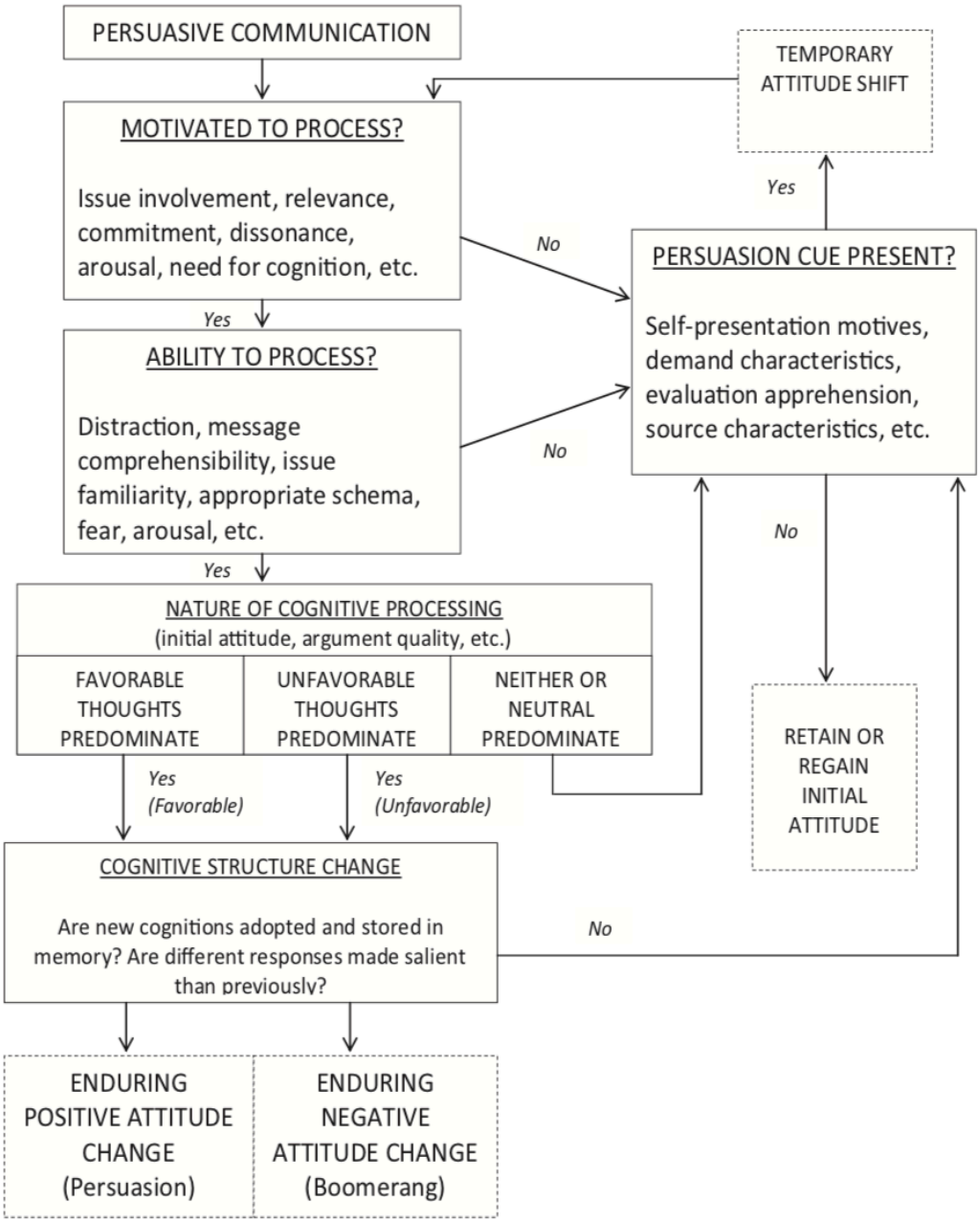


Figure 1. Elaboration Likelihood Model.

(Petty & Cacioppo,1986)

Appendix I

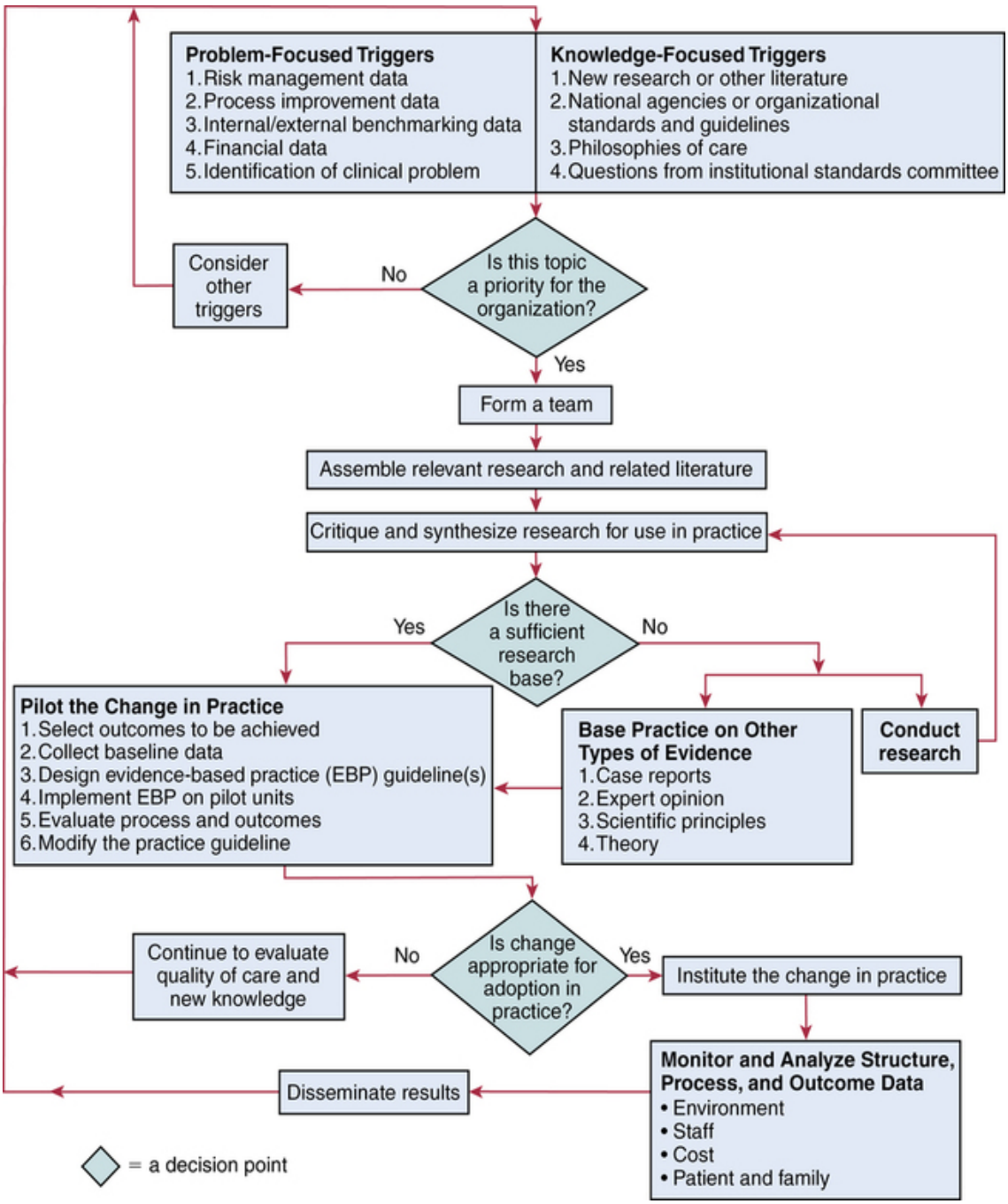


Figure 1.. The Iowa Model of Evidence-Based Practice to Promote Quality Care (1994)

(Titler, 1994)

Appendix J

Confidential

Baseline Parent Assessment Survey

Thank you for your time and participation in this project. Please complete the survey below.

Thank you!

Jodi Riggs

Arizona State University Drowning Prevention Mobile Survey, DNP Project Leader

DEMOGRAPHICS

1 Person completing the survey - Are you:

◯ Male
◯ Female

2 What is your relationship to the child:

◯ Parent
◯ Grandparent
◯ Legal Guardian
◯ Other Relative

3 What is your age (in years)? Fill in the blank

_____

4 What is the highest level of education you have completed?

◯ Some high school
◯ High school graduate, or equivalent (GED)
◯ Some college
◯ Trade/technical/vocational training
◯ Associate degree
◯ Bachelor's degree
◯ Master's degree and above

5 Which of the following categories best describes your employment status?

◯ Employed working 40 or more hours per week
◯ Employed working 1-39 hours per week
◯ Not employed
◯ Retired
◯ Disabled and not able to work

6 Ethnicity origin:

◯ White
◯ Hispanic or Latino
◯ Black or African American
◯ Native American or American Indian
◯ Asian Pacific Islander
◯ Other

ABOUT YOUR CHILD

7 Age of child #1 (age is in years)

◯ < 1 one year
◯ Between one and 4 years old

Do you have Additional children? If no, please proceed to the free text box to enter your email address.

◯ Yes
◯ No

Please type the ages of each additional child.

_____

8 In the free text box, please provide a working email address so that you can be contacted to complete a follow-up survey in three weeks.

_____

Which of the following do you think is the greatest danger to your child?
Please rank each response IN ORDER, from lowest danger (1) to highest danger (5) using each number only ONCE.

	1	2	3	4	5
Poisoning	◯	◯	◯	◯	◯
Motor Vehicle Crashes	◯	◯	◯	◯	◯
Drowning	◯	◯	◯	◯	◯
Falls	◯	◯	◯	◯	◯
Fire	◯	◯	◯	◯	◯

2 Most childhood drowning can be prevented (stopped before they happen).
Please choose only one of the following responses:

◯ Strongly disagree
◯ Disagree
◯ Neither agree OR disagree
◯ Agree
◯ Strongly agree

When you take your child, or children to swim, where do you go?
Mark ALL that apply

☐ My backyard or apartment/RV pool
☐ Public pool
☐ Friend/relative's pool
☐ Rivers/lakes
☐ I do not take my child swimming

Does your child attend daycare?
**If you select Yes, an additional question will populate.

◯ Yes
◯ No

Does the daycare have a pool?

◯ Yes
◯ No

I feel really worried when my child has access to a pool.
Please choose only one of the following responses:

◯ Not worried at all 5
◯ Slightly worried 4
◯ Somewhat worried 3
◯ Moderately worried 2
◯ Extremely worried 1

My child has natural swimming skills such as breath-holding, floating, and kicking.
Please choose only one of the following responses:

◯ Strongly agree 5
◯ Agree 4
◯ Neither agree OR disagree 3
◯ Disagree 2
◯ Strongly disagree 1

(SCENARIO) Anthony is three years old. He hasn't had swimming lessons. He has trouble following the rules his mother sets for him. When Anthony is in or near the pool, he is at risk for a drowning.
Please choose only one of the following responses:

◯ Strongly disagree 5
◯ Disagree 4
◯ Neither agree OR disagree 3
◯ Agree 2
◯ Strongly agree 1

(SCENARIO) Eliana is three years old. She has good swim skills. She always follows the rules her mother sets for her. When Eliana is in or near the pool, she is at risk for a drowning.
Please choose only one of the following responses:

◯ Strongly disagree 5
◯ Disagree 4
◯ Neither agree OR disagree 3
◯ Agree 2
◯ Strongly agree 1

Milestones Risk Score Calculation

20 points possible

How worried are you about your child's safety near the pool with adults present?
Please choose only one of the following responses:

- ◯ Not at all worried 5
- ◯ Slightly worried 4
- ◯ Somewhat worried 3
- ◯ Moderately worried 2
- ◯ Extremely worried 1

How important is it for you to assign an adult to supervise the pool area for a 15-minute period of time when your child is near the pool?
Please choose only one of the following responses:

- ◯ Not important 5
- ◯ Low importance 4
- ◯ Medium importance 3
- ◯ Highly important 2
- ◯ Essential 1

When the adult pool supervisor (Pool Boss) is watching children near the water, it is okay to do other things, like talk to other adults, send texts or talk on the phone.
Please choose only one of the following responses:

- ◯ Strongly agree 5
- ◯ Agree 4
- ◯ Neither agree OR disagree 3
- ◯ Disagree 2
- ◯ Strongly disagree 1

When it is mealtime at a pool party, how important is it to make sure all of the children have left the pool area and shut the pool gate?
Please choose only one of the following responses:

- ◯ Not important 5
- ◯ Low importance 4
- ◯ Medium importance 3
- ◯ Highly important 2
- ◯ Essential 1

Pool Party Risk Score calculation

20 points possible

When you are with your child at the pool or near a body of water, how often is he/she within arm's reach?
Please choose only one of the following responses:

- ◯ Never 5
- ◯ Rarely 4
- ◯ Sometimes 3
- ◯ Often 2
- ◯ Always 1

When you are supervising your child at the pool, how often is your cell phone on and close by?
Please choose only one of the following responses:

- ◯ Every time 5
- ◯ Almost every time 4
- ◯ Occasionally/ sometimes 3
- ◯ Almost never 2
- ◯ Never 1

If your child is wearing floaties or a life jacket while swimming or near the pool, how much supervision do they need at the pool?
Please choose only one of the following responses:

- ◯ None - I don't need to supervise 5
- ◯ Almost none - I can supervise a little less 4
- ◯ Occasionally/sometimes - I can supervise the same as I always do 3
- ◯ Almost every time - I tend to supervise more than I normally do 2
- ◯ Every time - I supervise my child every time, even when using a life jacket or floaties 1

How easy or difficult would it be for you to step away from the pool area while your child is swimming?
Please choose only one of the following responses:

- ◯ Very easy, my child knows how to swim and we have never had a problem at the pool 5
- ◯ Easy, It would be easy to leave my child alone if their sibling or other children were around 4
- ◯ Neutral, I would leave them alone as long as other adults were around 3
- ◯ Difficult, I would not be able to leave my child alone, but might consider it if I asked a friend or relative to take my place 2
- ◯ Very difficult, I would never leave my child alone by the pool, even if other family, friends or people are present 1

Supervision Risk Score Calculation

20 points possible

One way to keep my young child safe in the water, when I can't stay close by, is to have them wear inflatable armbands or "floaties."
Please choose only one of the following responses:

- ◯ Strongly agree 5
- ◯ Agree 4
- ◯ Neither agree OR disagree 3
- ◯ Disagree 2
- ◯ Strongly disagree 1

I choose flotation devices as safety items, based on the advice of friends and family.
Please choose only one of the following responses:

- ◯ Strongly agree 5
- ◯ Agree 4
- ◯ Neither agree OR disagree 3
- ◯ Disagree 2
- ◯ Strongly disagree 1

How likely are you to put a life jacket on your child at the pool?
Please choose only one of the following responses:

- ◯ Very unlikely 5
- ◯ Unlikely 4
- ◯ Neutral 3
- ◯ Likely 2
- ◯ Extremely likely 1

How confident are you that you can properly fit your child for a life jacket?
Please choose only one of the following responses:

- ◯ I have never seen or used a life jacket 5
- ◯ I am not confident 4
- ◯ I am somewhat confident 3
- ◯ I am confident 2
- ◯ I am very confident 1

Life Jacket Risk Score Calculation

20 points possible

How worried are you when a pool gate is propped open?
Please choose only one of the following responses:

- ◯ Not worried at all 5
- ◯ Slightly worried 4
- ◯ Somewhat worried 3
- ◯ Moderately worried 2
- ◯ Extremely worried 1

I am confident in MY swimming ability in water 8 feet deep.
Please choose only one of the following responses:

- ◯ I don't know how to swim 5
- ◯ I am not confident 4
- ◯ I am somewhat confident 3
- ◯ I am confident 2
- ◯ I am very confident 1

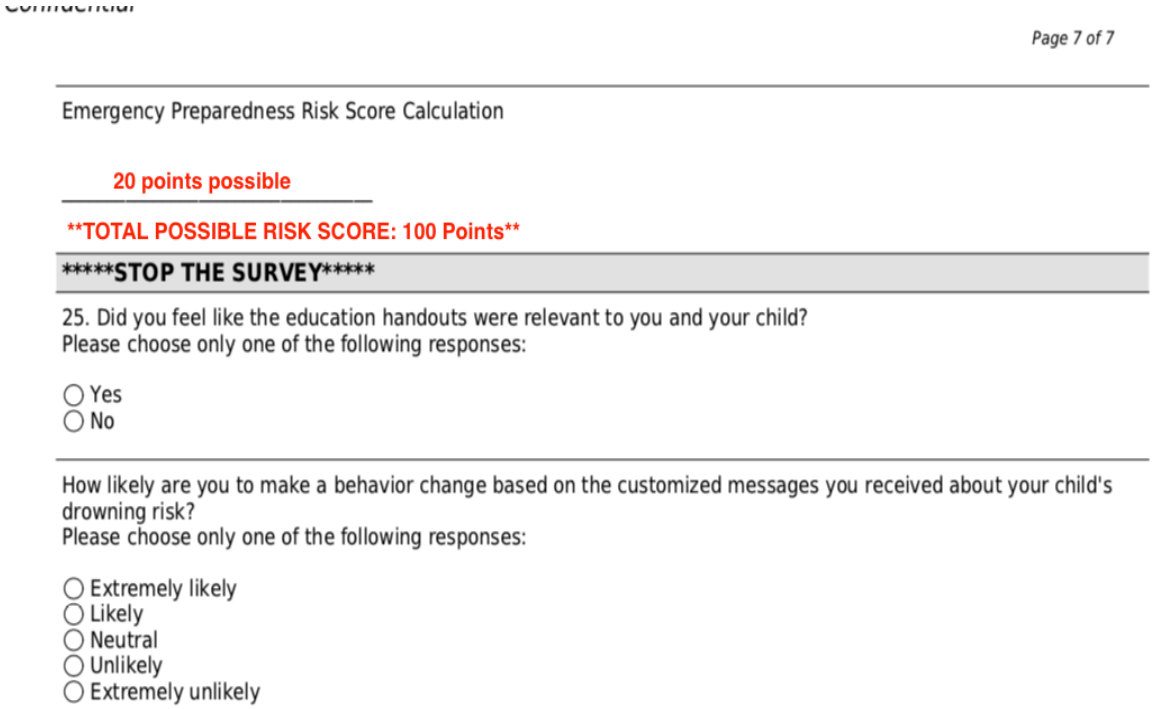
I would know what to do if there was a drowning emergency by the pool.
Please choose only one of the following responses:

- ◯ Strongly disagree 5
- ◯ Disagree 4
- ◯ Neither agree OR disagree 3
- ◯ Agree 2
- ◯ Strongly agree 1

If a child were having trouble swimming in the water, how likely would they be to wave their arms, scream for help, or splash to get your attention? Please choose only one of the following responses:

Please briefly PAUSE the survey after this question.

- ◯ Extremely likely 5
- ◯ Likely 4
- ◯ Neutral 3
- ◯ Unlikely 2
- ◯ Extremely unlikely 1



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Emergency Preparedness Risk Score Calculation

20 points possible

TOTAL POSSIBLE RISK SCORE: 100 Points

*****STOP THE SURVEY*****

25. Did you feel like the education handouts were relevant to you and your child?
Please choose only one of the following responses:

- ◯ Yes
- ◯ No

How likely are you to make a behavior change based on the customized messages you received about your child's drowning risk?
Please choose only one of the following responses:

- ◯ Extremely likely
- ◯ Likely
- ◯ Neutral
- ◯ Unlikely
- ◯ Extremely unlikely

Figure 1. 20-item tablet risk assessment survey.

Appendix K

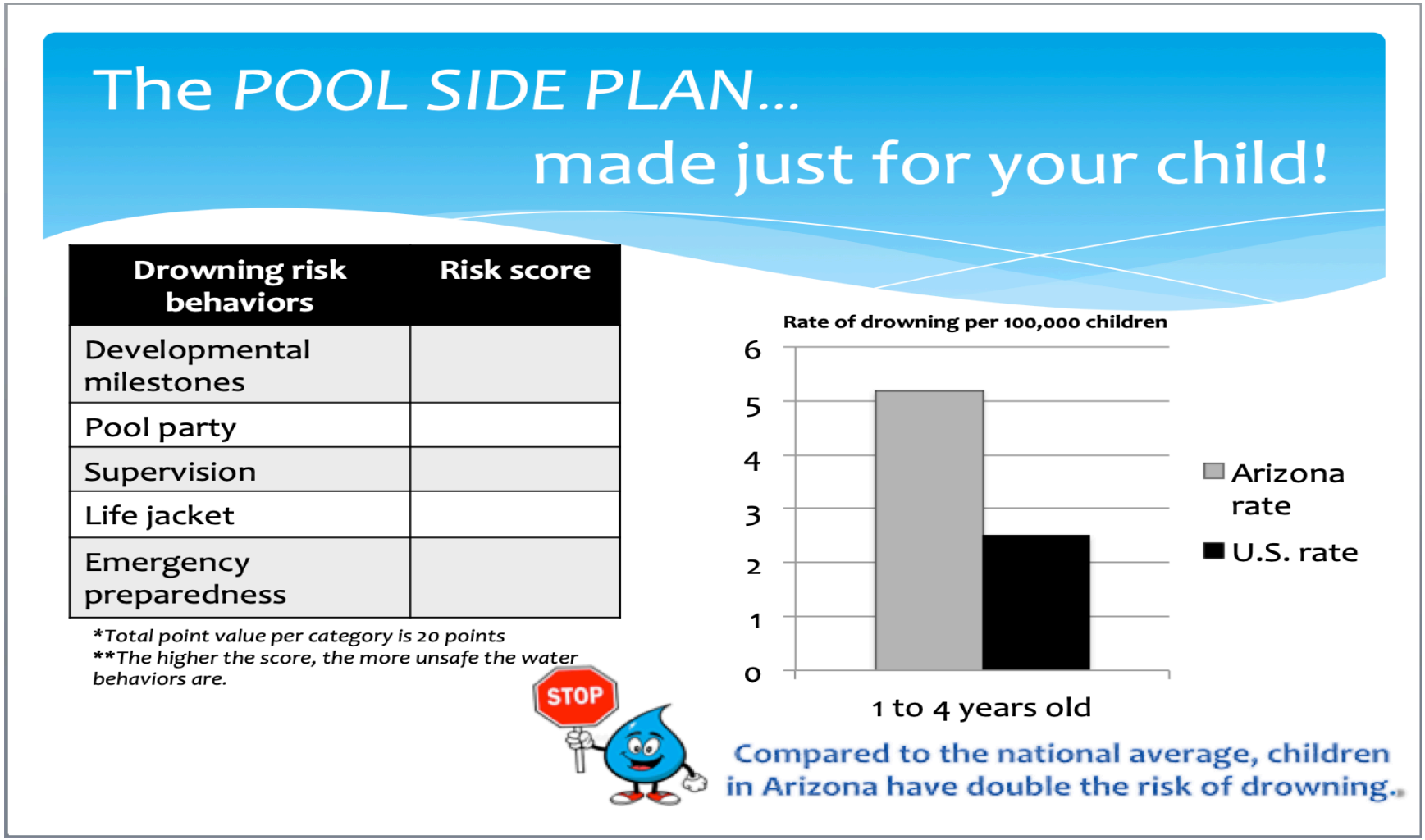

Figure 1. Summary page: Poolside plan.

Appendix L

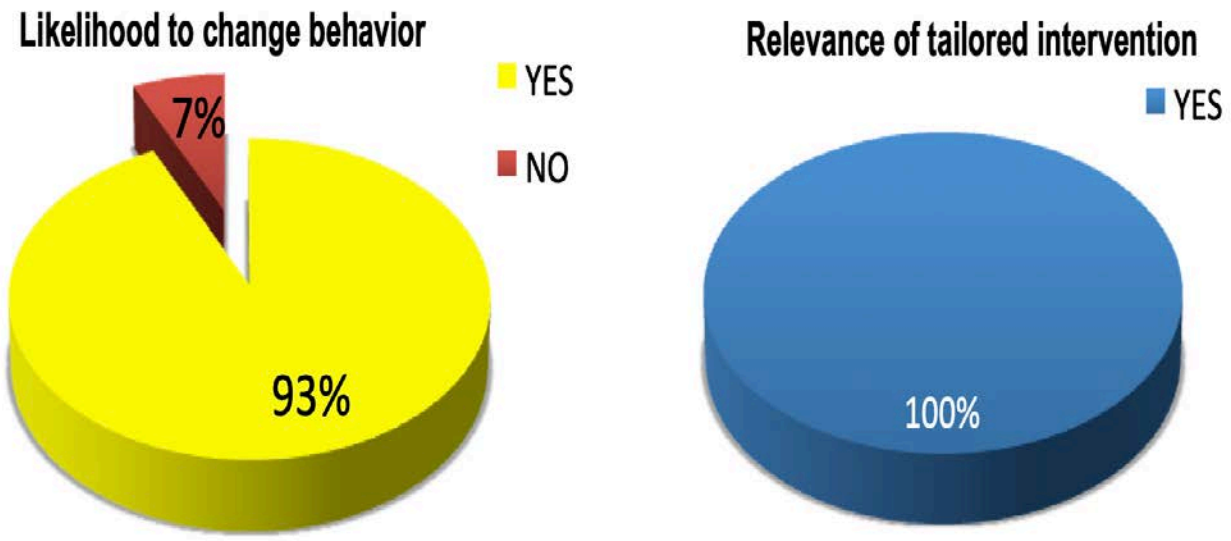

Figure 1. Primary outcome variables: Likelihood of behavior change and relevance of tailored intervention.