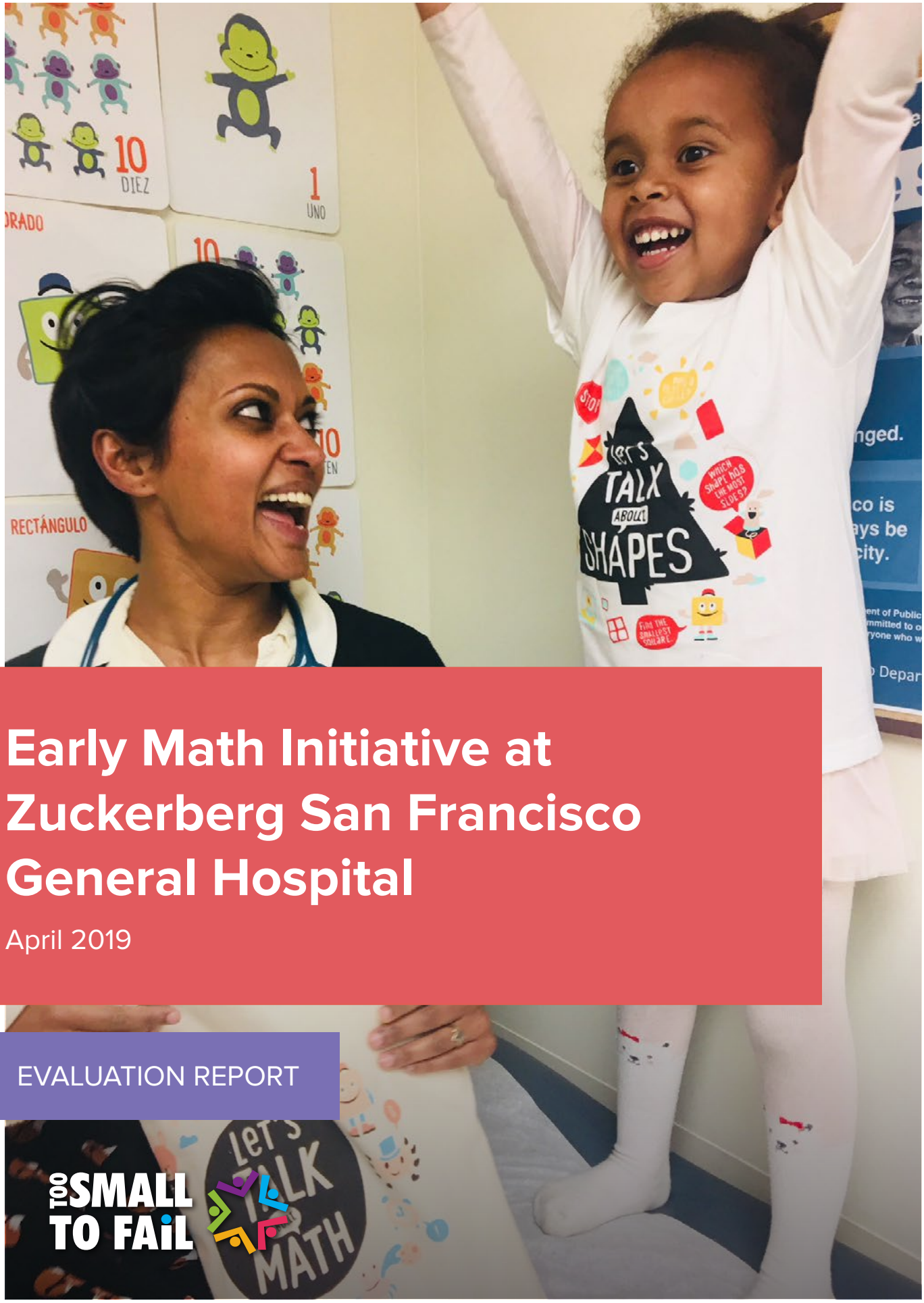

Early Math Initiative at Zuckerberg San Francisco General Hospital

April 2019

EVALUATION REPORT

About the Early Math Initiative

Too Small to Fail, the early childhood initiative of the Clinton Foundation, is leading a public awareness and action campaign to promote the importance of early brain and language development and to empower parents with tools to talk, read, and sing with their young children from birth. Today, almost 60 percent of children in the United States start kindergarten unprepared, lagging behind their peers in critical language and reading skills. Through partnerships with pediatricians, hospitals, faith-based leaders, community-based organizations, businesses, entertainment industry leaders, and others, *Too Small to Fail* is meeting parents where they are to help them prepare their children for success in school and beyond. Whether at the pediatrician's office or the playground, *Too Small to Fail* aims to make small moments big by creating opportunities for meaningful interactions anytime, anywhere.

The Children's Health Center of the Zuckerberg San Francisco General Hospital (ZSFG) provides comprehensive care to children from birth through 21 years old. Reflecting the overall mission of ZSFG, the Clinic primarily serves low-income families in the San Francisco Bay Area.

Between September 2017 and August 2018, pediatricians and nurse practitioners at the Children's Health Center shared educational messages with parents and caregivers of children 24-60 months old about the importance of early math skill building behaviors. Signs promoting the campaign were posted in the clinic waiting room, and large format versions of the card matching card game – a key part of the skill building toolkit - were placed in exam rooms.

Pediatricians and nurse practitioners in the clinic were invited to participate in a training session that outlined the core elements of early mathematics topics, including numbers, shapes, patterns, counting, and measurement. The training also shared the ways in which young children learn about early math concepts, including engaging in "math talk" with caregivers, having hands-on experiences such as card games, and being read books with math concepts. Health care providers learned a set of key messages to share with parents, emphasizing the ways in which everyday activities can help young children learn these concepts.

Participating parents received a tote bag with a children's book (a bilingual version of *Five Little Monkeys Jumping on the Bed* by Eileen Christelow), a children's t-shirt, a guide to early math activities, and an age appropriate card matching game. Parents and caregivers were invited to enroll in Ready4K, a text-based service with tips on early math activities for young children. Developed by educational researchers, Ready4K is an evidence-based family engagement curriculum delivered via text message. Each week, parents and caregivers receive fun facts and easy tips on how to promote their children's development by building on existing family routines – like pointing out the letters on shampoo bottles during bath time and naming their sounds, counting the number of steps on the way to the car or bus, or making feeling faces in the mirror.

Study findings prepared by Public Profit

CLINTON FOUNDATION

ZUCKERBERG SAN FRANCISCO GENERAL Hospital and Trauma Center

public profit

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Executive Summary

Too Small to Fail, the early childhood initiative of the Clinton Foundation, is leading a public awareness and action campaign to promote the importance of early brain and language development and to empower parents with tools to talk, read, and sing with their young children from birth.

This brief summarizes an evaluation of an early math initiative at the Children's Health Center of the Zuckerberg San Francisco General Hospital (ZSFG), in which pediatricians and nurse practitioners shared educational messages with parents and caregivers of children 24-60 months old about the importance of early math skill building behaviors. Two hundred and eighty-five (285) families participated in the initiative; 222 parents and caregivers completed a series of interviews with the evaluation team.

Participating parents received a tote bag with a children's book (a bilingual version of *Five Little Monkeys Jumping on the Bed* by Eileen Christelow), a children's t-shirt, a guide to early math activities, and an age appropriate card matching game. They were invited to enroll in Ready4K, a text-based service with tips on early math activities for young children.

Much of the evidence presented in this brief is drawn from structured interviews conducted with 222 parents and caregivers who completed three interviews with the study team. Sixty-one (61) non-participant parents and caregivers completed written surveys about select knowledge and behaviors, as well.

The Children's Health Center previously hosted a similar initiative – *Talk, Read, Sing* - focused on encouraging parents' early literacy behaviors. Some parents in the current study participated in this prior initiative; we explored differences in knowledge and behavior for both groups of parents and report statistically significant results. The early math initiative is based on a similar campaign at the Benioff Children's Hospital Oakland; we make select comparisons to the findings of that study where appropriate.

This study of the early math initiative at the Children's Health Center explored parents' attitudes toward early math skill building, their reaction to the educational session with a healthcare provider, and shifts in their math skill building activities with their young children.

Parents' Pre-Existing Attitudes About Early Mathematics Skill Building Activities

Parents were most likely to report reading, counting objects, and talking with their child to help them be ready for preschool or kindergarten

- The greatest proportion of parents reported reading (59%), counting objects (48%) and singing songs with their young child (31%) to help them get ready.

About half of parents had heard about the importance of helping their child build early math skills; educators, doctors, and family & friends are their most common sources of information

- Just under half of parents (49%) reported that they had heard about the importance of engaging in math activities with young children. Spanish-speaking parents were slightly more likely to report having heard about early mathematics skill building (51%) than their English-speaking counterparts (43%).
- Parents were most likely to have heard about the importance of early mathematics activities from their child's school or teacher (29%), preschool or childcare (18%), a doctor (16%), and from family and friends (15%).

Almost half of parents engage in early math skill building activities every day; most find it easy to do

- Nearly half of parents in the study (46%) reported that they engaged in early math activities every day. English-speaking parents were more likely to report engaging in math activities every day (58%) than their Spanish-speaking peers (41%).
- Nearly eight in ten parents (77%) reported that they did not have trouble engaging in early math activities with their child. English-speakers were far more likely to say doing math activities is hard (41%) than their Spanish-speaking peers (16%).

About one in five parents believe children start learning early math concepts at birth; those who were in the earlier *Talk, Read, Sing* initiative were most likely to know this

- About one in five parents who participated in the early math initiative (20%) said children begin learning about early mathematics concepts at birth.
- Those parents who previously participated in the *Talk, Read, Sing* initiative were notably more likely to think that children begin learning about early math concepts from birth than their peers – 29% compared to 15%.

Experience of the Early Math Initiative

Two-thirds of parents learned something new from their doctor

- About two-thirds of parents (67%) said they learned something new from the doctor, a substantially larger proportion than reported the same in a study of a similar initiative in Oakland (55%) or the proportion of parents that reported learning something new in the earlier *Talk, Read, Sing* campaign at the same clinic (49%).
- A larger proportion of Spanish-speaking parents reported learning something new – 73% – than their English-speaking peers (54%), a statistically significant difference. Parents of older children were also more likely to report learning something new (73%) than parents of younger children (63%).

Nearly all parents planned to use materials from the early math toolkit at home

- Nearly all parents (99%) said they'd use something from the toolkit at home – the book (85%) and card game (80%) were most frequently cited.
- Parents who participated in the *Talk, Read, Sing* initiative were more likely than their non-participant peers to report plans to use each of the toolkit items.

Three-quarters of parents planned to do something new with their child after meeting with a pediatrician

- Three-quarters of parents and caregivers (75%) reported that they will do something new based on the information they received from the doctor, a larger proportion than parents who participated in the earlier *Talk, Read, Sing* campaign at the same clinic (63%).

Parents' Behaviors After the Early Math Initiative

Nearly all parents remembered talking with their doctor about the importance of early math skills

- Ninety-five percent (95%) of parents reported remembering their talk with the doctor about the importance of early mathematics skill building activities.
- Spanish-speaking parents were more likely to report that they remembered speaking with the doctor (97%) than their English-speaking peers (87%).

The Evidence Keeps on Growing

This study summarizes a recent pilot of the *Too Small to Fail* trusted messenger strategy. "Trusted messengers" include medical professionals and educators who offer research-based advice and encouragement to parents of young children.

Since 2015, *Too Small to Fail* and its partners have supported a number of local pilot projects to test the effectiveness of the campaign's trusted messenger strategy. While the details of each pilot varied, we are building a base of knowledge that suggests this strategy has consistent benefits for parents and caregivers:

- Parents and caregivers of young children are eager to support their child's intellectual development and report positive attitudes toward their role in helping their child.
- The majority of parents report learning something new from their interaction with a trusted messenger. Spanish-speaking parents are most likely to report learning something new.
- Parents consistently report substantial shifts in their interactions with their children, engaging more frequently in the types of skill-building activities they were encouraged to do.
- Though limited at this time, available evidence suggests that parents learn and remember more when they participate in multiple trusted messenger style activities, such as repeated conversations with pediatricians or seeing a public awareness campaign and talking with a trusted messenger.

Parents were much more likely to engage in early math activities every day after meeting with a pediatrician

- The proportion of parents who reported engaging in early math skill building activities daily rose by 12 percentage points (58%, up from 46%) after meeting with a pediatrician.
- The proportion of Spanish-speaking parents who engaged in early math "some days" declined from 32% to 20%, while the proportion reporting "most days" or "every day" increased from 65% to 79%.
- Parents who participated in the early math initiative were more likely to engage in these behaviors every day (58%) than those who did not participate in the initiative (29%).

Parents found the Ready4K text service helpful and nearly all remained enrolled during the study period

- Two hundred and twenty-six parents (226) enrolled in the Ready4K text service during the study period, about 80% of parents who participated in the initiative. As of August 31, 2018, 211 remained enrolled in the service, a 93% retention rate.
- During their follow up interview, 84% of parents said they learned something new from the Ready4K service.

Evaluation Questions and Data Sources

The evaluation team, comprised of staff members from Public Profit, an independent evaluation consultancy, and staff from the Children's Health Center, explored the extent to which participation in the early mathematics initiative was associated with changes in parents' knowledge, confidence, or behaviors.

The current study builds from a prior study of an early mathematics initiative at the Benioff Children's Hospital in Oakland, California and a study of an early literacy initiative at the ZSFG Children's Health Center. Each of these prior studies found promising initial evidence that parents remembered the interaction with their pediatrician a few months later and were likely to engage in age-appropriate skill-building behaviors more often.

This study builds upon this foundation by exploring differences in parental knowledge, attitudes and behaviors by a variety of demographic characteristics, explore the extent to which participation in the prior *Talk, Read, Sing* (TRS) campaign is associated with differences in attitudes or behaviors, and makes select comparisons to non-participant parents whose children attended the same clinic.

This study incorporates data from multiple sources, see the appendix for a table of data sources and sample sizes:

- In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician.
- Phone-based interview conducted in English and Spanish with study participants about eight weeks after their conversation with a pediatrician.
- Enrollment statistics from the Ready4K text messaging platform.
- Written survey from parents of young children who did not participate in the intervention.

Two hundred eighty-five (285) parents participated in the early math initiative. Of these, two hundred twenty-two (222) parents completed all three interviews; the results shared in this briefing are drawn primarily from those interviews. Of these 222 parents, 91% identified as female. About half of interview respondents were between 30-39 years old, and 82% identify as Latinx. See the appendix for detailed information about the study participants.

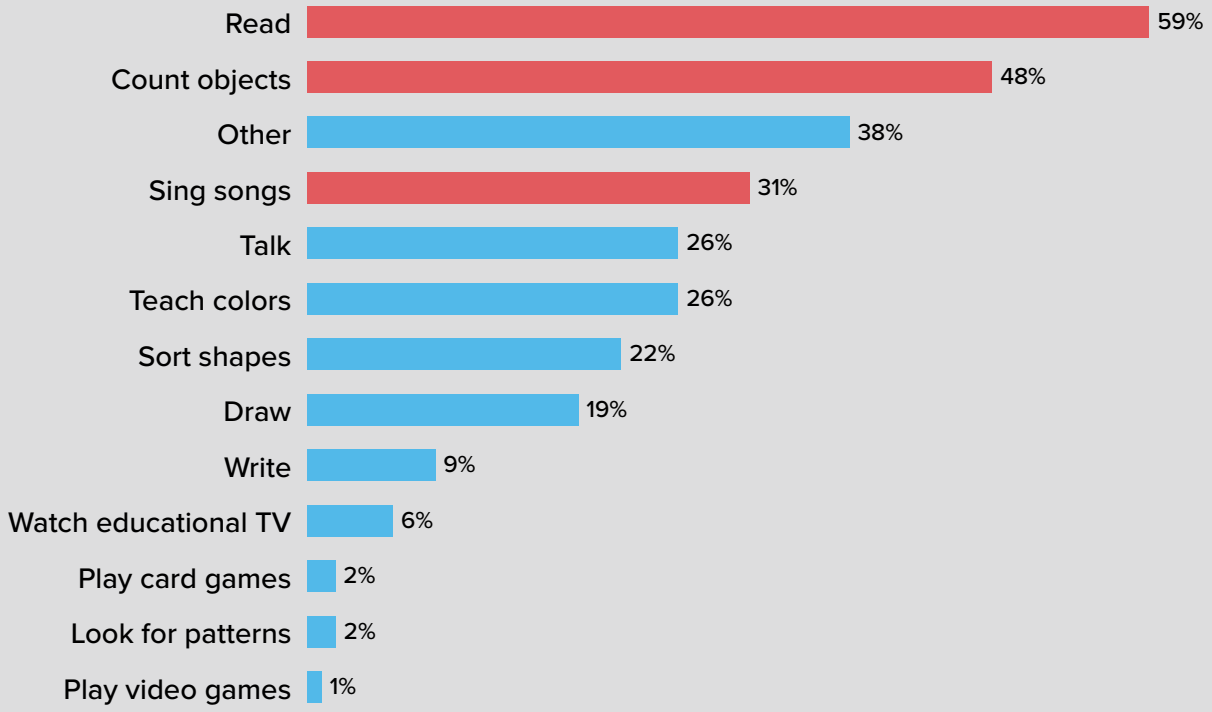
Parents' Pre-Existing Attitudes About Early Mathematics Skill Building Activities

Parents report reading, counting objects, and singing with their child to help them be ready for preschool or kindergarten

Just before they met with a pediatrician, parents and caregivers were asked about what they did to help their child get ready for school. They described their practices to the interviewer, who then grouped them into thematic categories. The greatest proportion of parents reported reading (59%), counting objects (48%) and singing songs with their young child (31%). The "other" readiness activities parents reported included enrolling their child in childcare, playing together, and reciting the alphabet.

There were no statistically significant differences in parents' self-reported behaviors based on parents' language or previous participation in the *Talk, Read, Sing* campaign at the same clinic.

Figure 1: What do you do to help your child get ready to be successful in preschool or kindergarten?



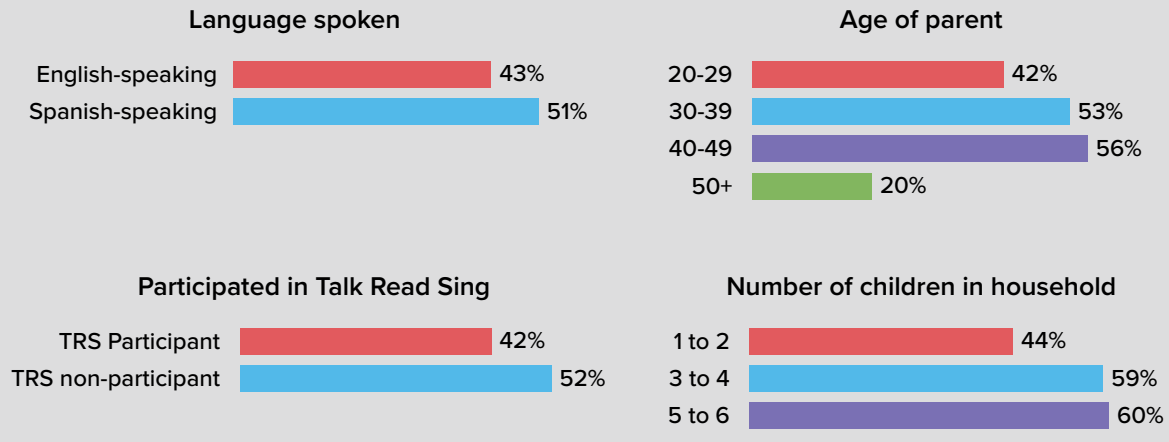
Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Parents who did not participate in the early math initiative also most commonly reported reading, talking, singing songs, and counting objects. They were notably more likely to report watching educational television with their child. This may stem from differences in the ways that parents provided input on their strategies: those in the study were asked to verbally describe what they did to help their child to be successful, while non-participants completed a brief survey in which they could check multiple options from a list.

About half of parents had heard about the importance of helping their child build early math skills; educators, doctors, and family & friends are their most common sources of information

Before meeting with a pediatrician, just under half of parents (49%) reported that they had heard about the importance of engaging in math activities with young children. Spanish-speaking parents were slightly more likely to report having heard about early mathematics skill building (51%) than their English-speaking counterparts (43%). Those who previously participated in the *Talk, Read, Sing* initiative were less likely to have heard about the importance of math activities than those who did not participate (42% compared to 52%). Available evidence doesn't suggest why this might be the case, though it is possible that parents who participated in the earlier initiative felt more comfortable answering this question accurately. That is, they may feel less pressure to provide the "right" answer to the study team, leading to a counterintuitive finding. Older parents, and parents with more children in their household, were also more likely to have heard about the importance of math activities (see Appendix C). These differences are not statistically significant, however.

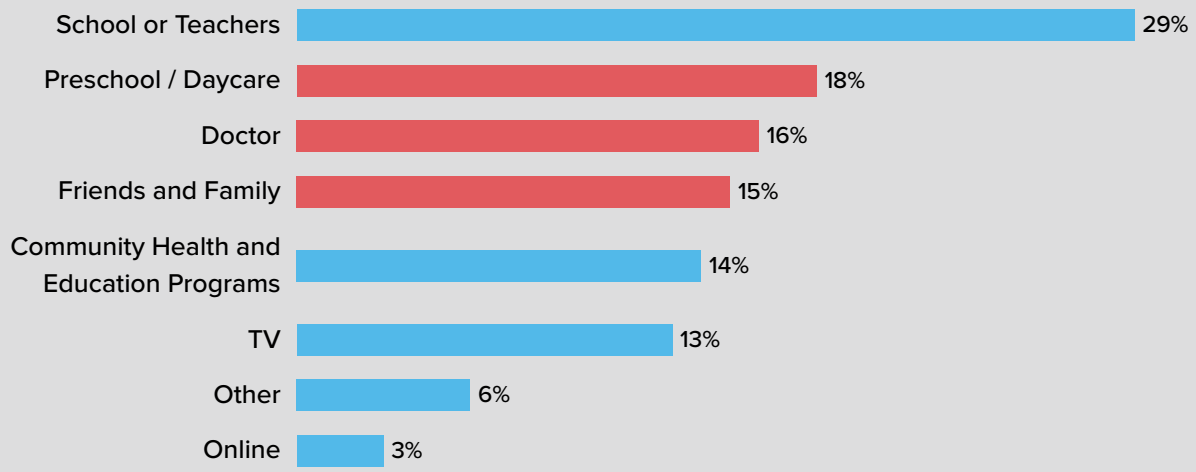
Figure 2. Have you heard from anywhere about the importance of doing math activities with young children, like counting, looking for patterns, and making shapes? (% yes response)



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Parents were most likely to have heard about the importance of early mathematics activities from their child's school or teacher (29%[1]), their child's preschool or child care (18%), a doctor (16%), and from family and friends (15%). There were no notable differences in the sources of information for parents based on their preferred language.

Figure 3. Where did you hear about the importance of doing math activities, like counting, looking for patterns, and making shapes?



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Respondents who previously participated in the *Talk, Read, Sing* initiative were more likely to cite community health and education programs, doctors, and television, while those who did not participate were more likely to cite preschool or childcare as sources of information about early math. (See Appendix C.)

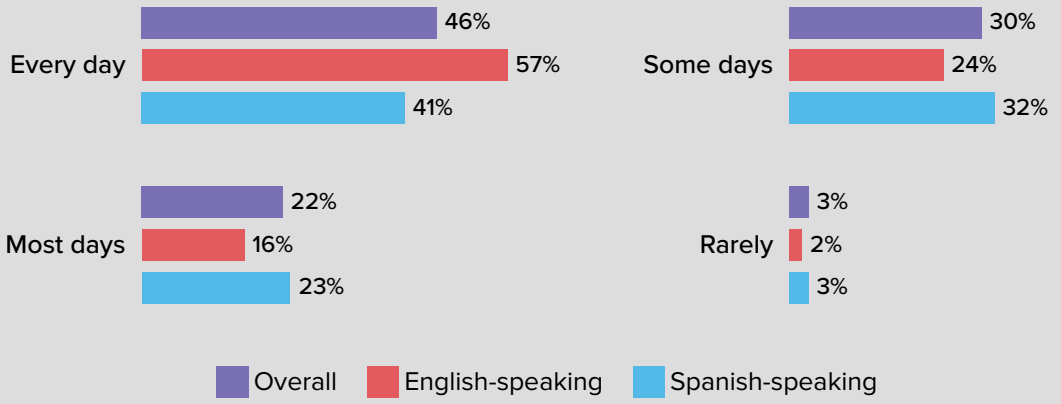
These findings are quite similar to the study of an early math promotion initiative at Benioff Children's Hospital of Oakland, suggesting that parents of young children in these communities rely on similar sources of information for advice about supporting their child's development.

[1] This category includes parents' mention of "school" or "teachers," including older siblings' teachers and school staff.

Almost half of parents engage in early math skill building activities every day; most find it easy to do

Nearly half of parents in the study (46%) reported that they engaged in early math activities every day. English-speaking parents were more likely to report engaging in math activities every day (58%) than their Spanish-speaking peers (41%), a statistically significant difference. Older parents and those with higher levels of formal education reported more frequent math skill building activities, though these differences were not statistically significant.

Figure 4. How often do you do math activities with your child, like counting, looking for patterns, and making shapes?



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Nearly eight in ten parents (77%) reported that they did not have trouble engaging in early math activities with their child, a larger proportion than in the similar study at the Benioff Children's Hospital Oakland.[2] Among parents who found it hard to engage their child with math activities, the largest proportion mentioned that their child became distracted or struggled to focus (48%), and that their child became frustrated (51%).

English-speakers were far more likely to say doing math activities is hard (41% compared to 16% of Spanish-speaking parents – a statistically significant difference). There were no notable differences between those who participated in the prior *Talk, Read, Sing* initiative and those who did not.

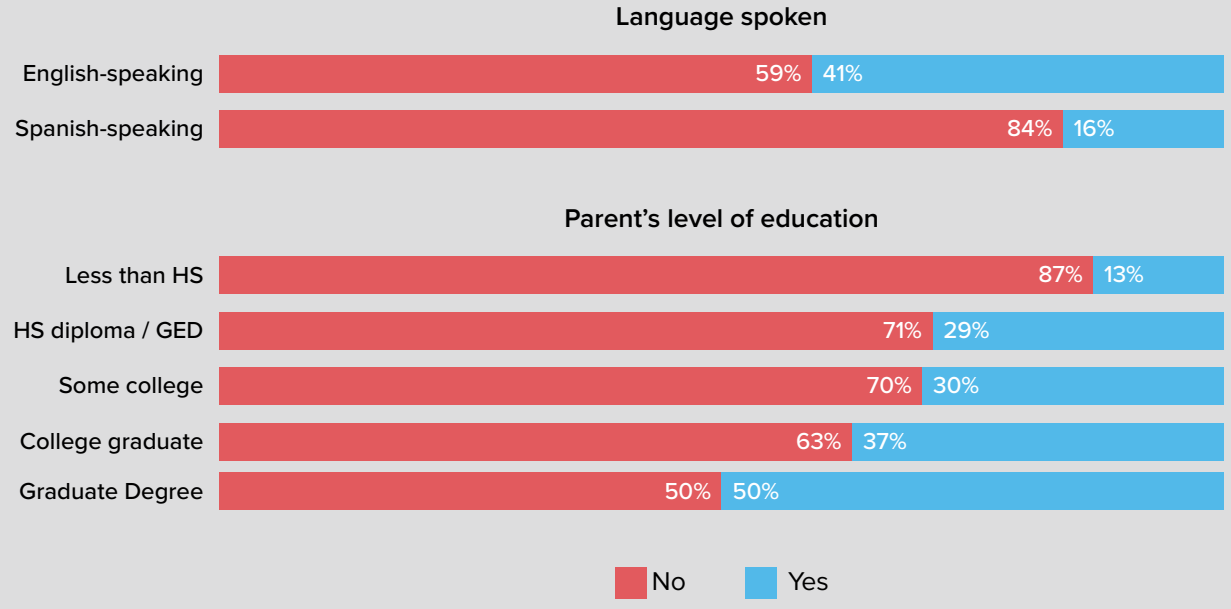
[2] Too Small to Fail, *Early Math Intervention at UCSF Benioff Children's Hospital Oakland*, April 2017.

Parents with more years of formal education were more likely than their peers to report doing early math activities as challenging. The study team member who conducted the interviews noted that many parents were initially apprehensive about the idea of "teaching math" to their child and were relieved to learn that early mathematics activities include everyday interactions like counting objects, finding patterns, and describing shapes and colors. This may explain why parents with more years of formal education find it challenging to do math activities, as they might be attempting to share concepts that aren't developmentally appropriate with their young children.

When asked why parents might find it challenging to engage in early math activities, a pediatrician at the clinic said,

> *"I found that most parents - regardless of education - believe math is limited to numbers. They were pleasantly surprised that activities they were already doing - shapes, comparisons, measurements - also promoted early math learning, not just new words. I think one of the greatest strengths of Too Small to Fail is helping parents identify how much they are already teaching their kids, and how much learning takes place within each moment of parent-child interaction."*

Figure 5. Is it hard to do math activities with your child, like counting, looking for patterns, and making shapes?



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

About one in five parents believe children start learning early math concepts at birth; those who were in the earlier Talk, Read, Sing initiative were most likely to know this

When asked at what age children begin to learn early mathematics concepts like counting, patterns, and shapes, about one in five parents who participated in the early math initiative (20%) said children begin learning at birth. Another 18% reported that children begin learning about early math concepts as early as 12 months old.

Those parents who previously participated in the *Talk, Read, Sing* initiative were notably more likely to think that children begin learning about early math concepts from birth than their peers (29% compared to 15%). Similarly, eight in ten prior *Talk, Read Sing* participants (82%) reported that children begin learning as early as 2 years old, compared to 69% of parents who didn't participate in the prior campaign.

Table 1. At what age do you think that children begin learning about things like counting, patterns, and shapes?

	English-speaking	Spanish-speaking	TRS participant	TRS non-participant	**Overall**
Since birth	21%	19%	29%	15%	**20%**
As early as 12 months old	18%	17%	21%	16%	**18%**
As early as 2 years old	36%	36%	32%	38%	**36%**
Between 3 and 4 years old	19%	18%	15%	20%	**19%**
At about 5 years old	5%	7%	1%	9%	**6%**
Don't know	2%	2%	1%	2%	**2%**

Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

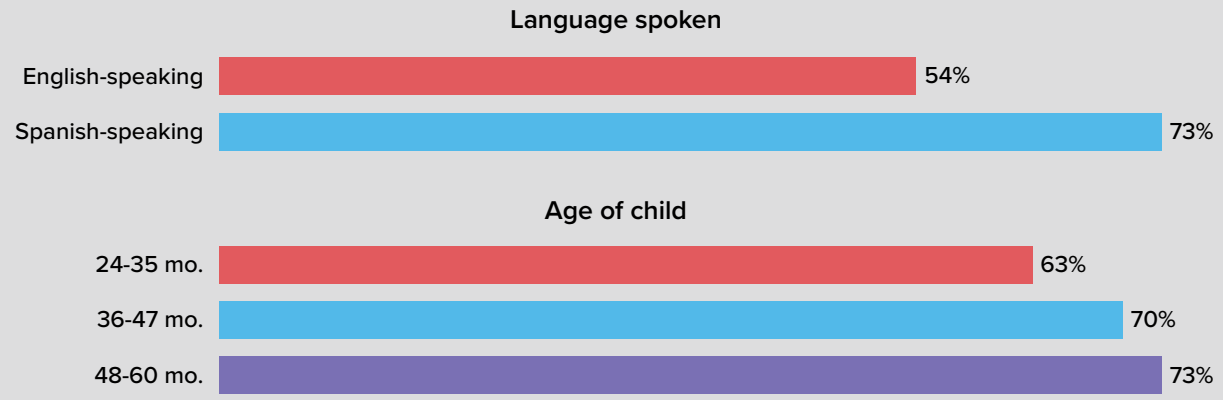
Experience of the Early Math Initiative

Two-thirds of parents learned something new from their doctor

Immediately after their conversation with a pediatrician about the importance of supporting children's early math skills, parents were asked about the visit. About two-thirds of parents (67%) said they learned something new from the doctor, a substantially larger proportion than reported the same in a study of a similar initiative in Oakland (55%)[3] or the proportion of parents that reported learning something new in the earlier *Talk, Read, Sing* campaign at the same clinic in San Francisco (49%).[4]

A larger proportion of Spanish-speaking parents reported learning something new – 73% – than their English-speaking peers (54%), a statistically significant difference. Parents of older children were also more likely to report learning something new than parents of younger children (73% compared to 63%). Among parents that learned something new, they were most likely to report learning about new materials or techniques (44%), and the importance of engaging in early math activities often (8%).

Figure 6. Did you feel like you learned anything new from the doctor?

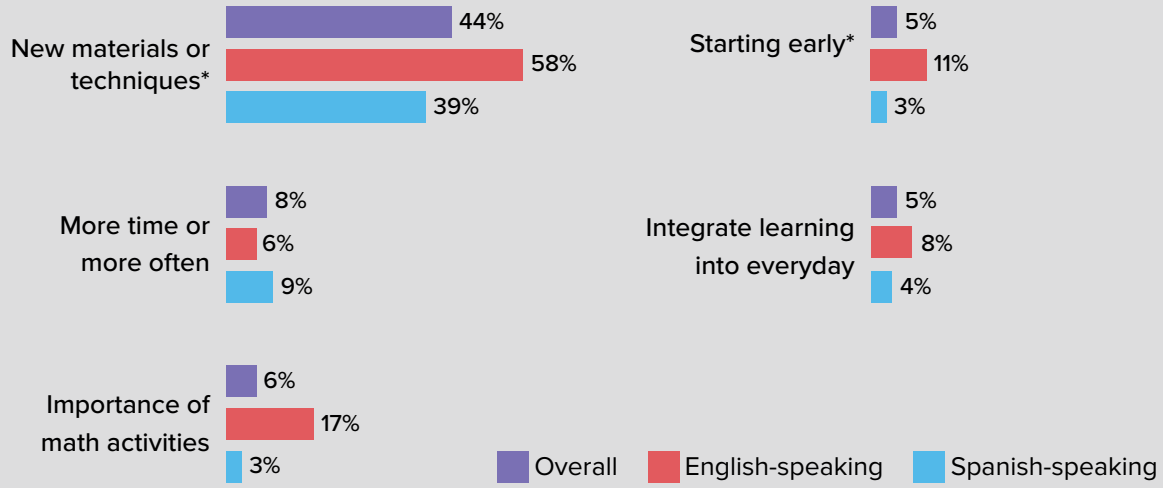


Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

[3] Too Small to Fail, *Early Math Intervention at UCSF Benioff Children's Hospital Oakland*, April 2017.

[4] Too Small to Fail, *Early Literacy Intervention at Zuckerberg San Francisco General Hospital*, September 2018.

Figure 7. What did you learn that was new?



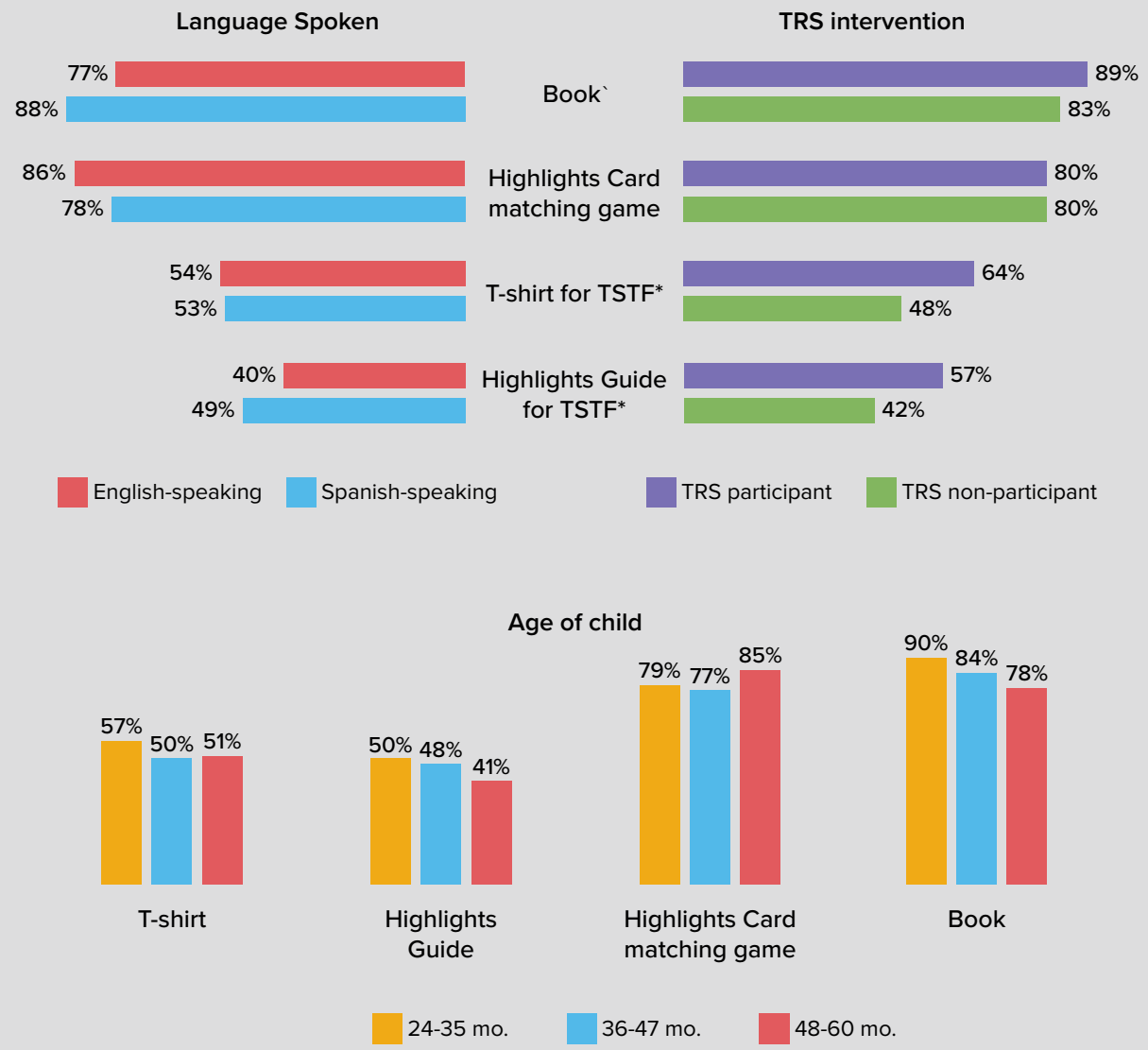
Source: In-person interviews conducted in English and Spanish with study participants immediately after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

**Indicates statistically significant difference between groups.*

Nearly all parents planned to use materials from the early math toolkit at home

Nearly all parents (99%) said they'd use something from the toolkit at home – the book (85%) and card game (80%) were most frequently cited. Spanish-speaking parents were more likely to report plans to use the book (88% compared to 77% for English-speaking parents) while English-speaking parents were more likely to report plans to use the card game (86% compared to 78% for Spanish-speaking parents). Parents who participated in the *Talk, Read, Sing* initiative were more likely than their non-participant peers to report plans to use each of the toolkit items. Parents of younger children were most likely to report plans to use the book while parents of older children reported plans to use the matching game, though there were no statistically significant differences in these rates based on children's ages.

Figure 8. Is there anything in the tote bag that you think you'll use when you go home?



Source: In-person interviews conducted in English and Spanish with study participants immediately after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

`Indicates statistically significant difference in language spoken groups.

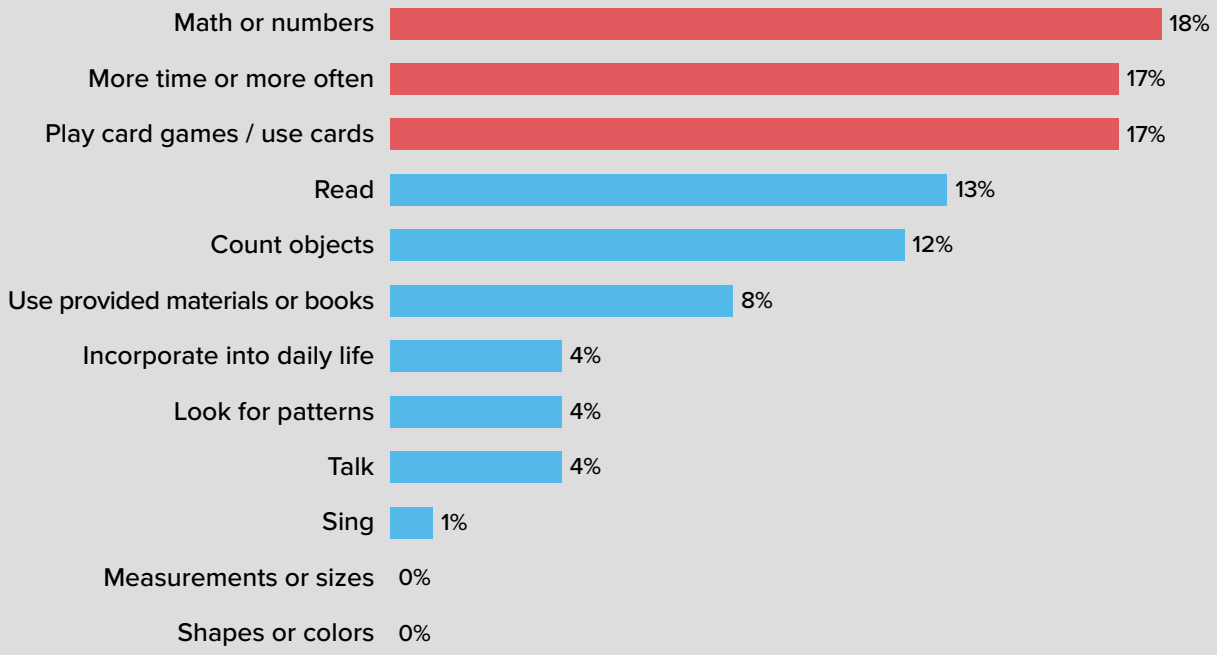
**Indicates statistically significant difference in TRS intervention groups.*

Informal interviews with pediatricians and clinic staff affirm parents' self-reports; they observed that the Highlights card matching game was a "big hit" and noted that parents enjoyed receiving the *Ten Little Monkeys* book for their child.

Three-quarters of parents planned to do something new with their child after meeting with a pediatrician

Three-quarters of parents and caregivers (75%) reported that they will do something new based on the information they received from the doctor, a larger proportion than parents who participated in the earlier *Talk, Read, Sing* campaign at the same clinic (63%).[5] Among parents that planned to do something new, parents were most likely to plan to engage their child with math or numbers (18%), to play card games (17%), and dedicate more time to early math skill building activities (17%).

Figure 9. What do you think you'll do that's new or different?



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

When asked if there was anything else that would help them do math activities with their child, respondents most often mentioned the desire for more materials, followed by the desire for more techniques or ideas of how to do activities with their children. A few respondents mentioned the need for more time.

[5] Too Small to Fail, *Early Literacy Intervention at Zuckerberg San Francisco General Hospital*, September 2018.

Pediatricians and clinic staff value the initiative

As noted earlier, this is the second *Too Small to Fail* campaign at the Children's Health Center, and many pediatricians and clinic staff were part of both the early literacy and early math initiatives. Their support is critical to the success of the initiative, whether in helping to identify which families are eligible to participate, talking with parents about early mathematics activities, or encouraging parents to consider participating.

Informal feedback suggests that the Children's Health Center team valued the early math initiative and saw it as a valuable experience for their patients. One pediatrician said,

> *"The Too Small to Fail initiatives were absolutely a positive addition to our clinic. Having tangible tools to give out to parents and kids is one of the most satisfying parts of the clinic visit. Also, since other families see the tote bags or shirts, they inquire about what those materials are for - creating yet another 'teaching' opportunity about early learning."*

The study team member who conducted parent interviews in the clinic noted that the early math initiative improved parents' visit and benefited children:

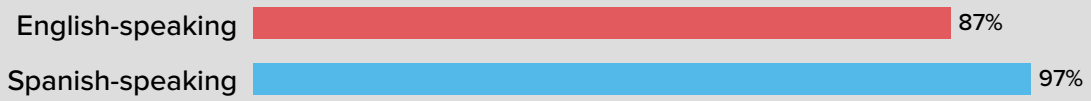
> *"[Health care providers] always talk about how happy the parents are to receive the items. They were a big fan of the times when I was able to talk to parents [to conduct the first interview] while they were waiting. Providers have told me that it made them feel better about having their patients wait because it was productive and coming in with a gift bag was a nice way to start the visit.*
>
> *One provider I remember would give me feedback at the end of the day and say something along the lines of 'Oh I'm so glad that you were able to get patient x because they're a bit behind on their milestones and they really need this.'"*

Parents' Behaviors After the Early Math Initiative

Nearly all parents remembered talking with their doctor about the importance of early math skills

At the follow up interview 8 to 12 weeks later, 95% of parents reported remembering their talk with the doctor about the importance of early mathematics skill-building activities. Spanish-speaking parents were more likely to report that they remembered speaking with the doctor than their English-speaking peers (97% versus 87%, a statistically significant difference). Parents who previously reported learning something new from the doctor were slightly more likely to remember the conversation with the doctor when asked at the follow up interview (95% compared to 91%), though this difference is not statistically significant.

Figure 10. Do you remember the doctor talking to you at your last visit about the importance of doing math activities with your child like counting, looking for patterns, and making shapes?



Source: Phone-based interview conducted in English and Spanish with study participants 8-12 weeks after their conversation with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Compared to immediately following the intervention, parents were more likely to remember the doctor recommending that parents incorporate math activities into daily life, like counting the number of cars that pass by. Parents also remembered the doctor talking to them about counting objects, using numbers, and talking about shapes and colors with their child.

Table 2. Can you tell me what you remember?

	English-speaking	Spanish-speaking	Overall
Count objects	36%	32%	**35%**
Math or numbers	25%	33%	**27%**
Incorporate into daily life	14%	21%	**16%**
Shapes or colors	15%	18%	**15%**
Benefits for child	13%	14%	**13%**
Read*	8%	18%	**11%**
Use provided materials or books	11%	11%	**11%**
Play card games/use cards	7%	12%	**8%**
More time or more often*	3%	12%	**6%**
Talk	5%	5%	**5%**
Look for patterns*	1%	7%	**3%**
Measurements or sizes*	1%	11%	**3%**
Sing	1%	2%	**1%**

Source: Phone-based interview conducted in English and Spanish with study participants 8-12 weeks after their conversation with a pediatrician. N = 222; English n = 67, Spanish n = 155.

**Indicates statistically significant difference between groups.*

Parents remember receiving the toolkit at their visit and report using the book and the Highlights Card matching game

The vast majority of parents (98%) remember receiving the toolkit materials. When asked which materials specifically they remembered, most parents cited the book (92%), the t-shirt (77%) and the Highlights Card matching game (70%). Of those who remember the materials, 99% said they used items from the tote bag. The most popular item was the book, with three-quarters of parents (75%) reporting using it. The Highlights Card matching game was also popular, with 65% of parents using it. Fewer parents reported using the t-shirt (38%), the Highlights Guide (11%) and the tote bag (6%).

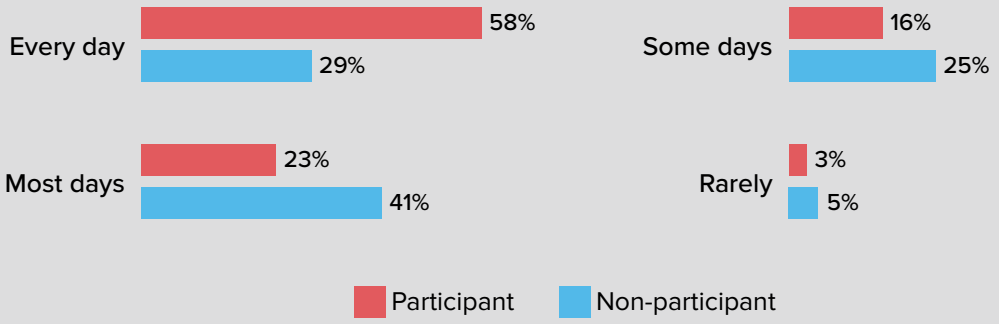
Spanish-speaking parents were slightly more likely to report using the book than English speaking parents (77% to 72%) while English-speaking parents were more likely to report using the Highlights Card matching game than their Spanish-speaking peers (69% to 64%). These differences are not statically significant, however.

Parents were much more likely to engage in early math activities every day after meeting with a pediatrician

The proportion of parents who reported engaging in early math skill building activities daily rose by 12 percentage points (58%, up from 46%) after meeting with a pediatrician. These shifts are similar to those observed in the Oakland early math study.[6] On the other hand, the proportion of parents who reported "rarely" engaging in early math activities with their child remained relatively steady.

Available evidence suggests that parents who talked with a pediatrician about the importance of early math activities were more likely to engage in these behaviors every day than those who did not. More than half (58%) of these parents reported engaging in early math activities every day compared to 29% of parents whose children attended the urgent care clinic in the same hospital but did not speak with a pediatrician. (See Appendix C.)

Figure 11. How often do you do math activities with your child, like counting, looking for patterns, and making shapes? (Participant vs. Non-Participant)



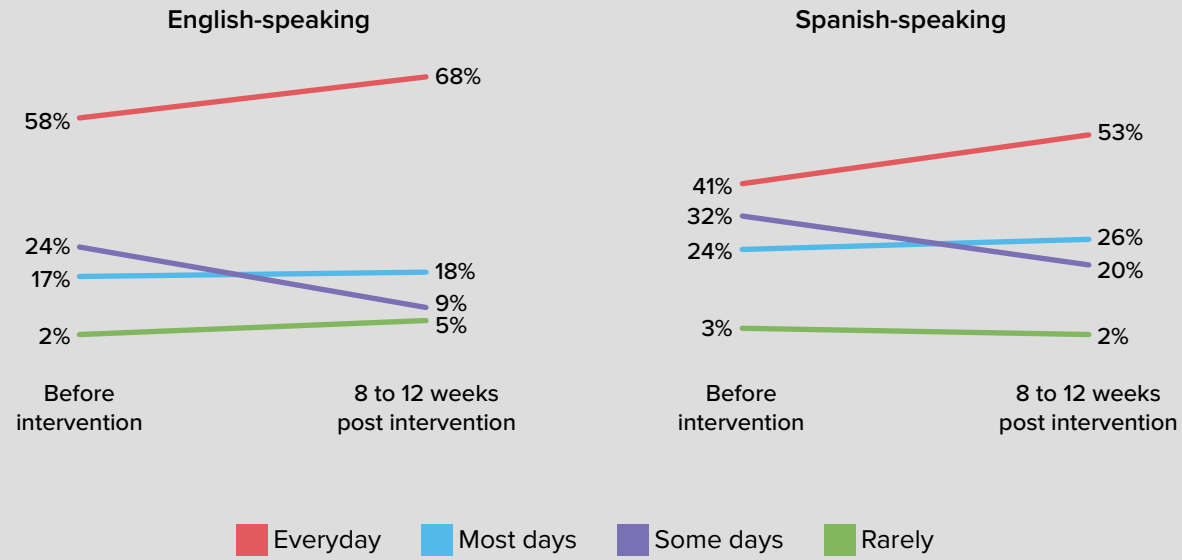
Sources: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155. Survey of non-participant parents whose child visited San Francisco General in Fall 2018. N = 61; English n = 23, Spanish n = 38.

While a larger proportion of English-speaking parents reported engaging in early math activities daily, Spanish-speaking parents reported some of the largest shifts in behavior 8 to 12 weeks after meeting with a pediatrician. The proportion of Spanish-speaking parents who engaged in early math "some days" declined from 32% to 20%, while the proportion reporting "most days" or "every day" increased from 65% to 79%.

Of those who reported engaging in math activities with their child less than every day before the initiative, 60% increased the frequency of math activities after talking with a physician.

[6] Too Small to Fail, *Early Math Intervention at UCSF Benioff Children's Hospital Oakland*, April 2017.

Figure 12. How often do you do math activities with your child, like counting, looking for patterns, and making shapes? (Participant responses only)



Source: In-person interviews conducted in English and Spanish with study participants immediately before their conversation about early mathematics skill development with a pediatrician, and phone-based interviews conducted 8-12 weeks after their conversation. N = 222; English n = 67, Spanish n = 155.

Parents found the Ready4K text service helpful and nearly all remained enrolled during the study period

As noted earlier, parents were invited to enroll in Ready4K, a free text messaging service that provides parents of young children with practical strategies to support their child's early mathematics skill development. Texts are tailored to children's developmental stage and aligned with the California Preschool Learning Foundations.[7] Texts are sent three times a week and incorporate a mix of facts and suggested activities. Two hundred and twenty-six parents (226) enrolled in the service during the study period (out of 285 enrolled in the initiative). As of August 31, 2018, 211 remained enrolled in the service, a 93% retention rate.

During their follow up interview 8 to 12 weeks after initially enrolling, 84% of parents said they learned something new from the Ready4K service. When asked what was helpful about the service, parents mentioned helpful tips for everyday activities like counting stairs, and that is was useful to be reminded to engage their children in early math skill building on a regular basis.

[7] The California Preschool Learning Foundations outline key knowledge and skills that most children can achieve when provided with the kinds of interactions, instruction, and environments that research has shown to promote early learning and development. (https://www.cde.ca.gov/sp/cd/re/psfoundations.asp)

Figure 13. Sample Ready4K texts

California Preschool Learning Foundation	FACT (Monday)	TIP (Wednesday)	GROWTH (Friday)
Mathematics. Number Sense. 1.0 Children expand their understanding of numbers and quantities in their everyday environment.	FACT: When children count things 1-by-1, they learn that numbers represent amounts. This is a big first step towards learning harder math skills.	TIP: As you do the laundry, count the socks 1-by-1 with your child as you put them in the washing machine. Can your child count the shirts on his/her own?	GROWTH: Keep counting objects 1-by-1. You're preparing 4K! Try counting shirts as you put them away. When you're done, ask: How many shirts did we put away?
Mathematics: Measurement. 1.0 Children expand their understanding of comparing, ordering and measuring objects.	FACT: Comparing groups of objects helps children learn about the concepts of more, less and equal - key building blocks of addition and subtraction.	TIP: At mealtime, ask your child to compare food groups: Do you have more fruits or veggies on your plate? How do you know? Count to find out!	GROWTH: Keep comparing groups to prepare 4K! Now ask: Can you make the groups of fruits and veggies equal? Eat more of one until they're equal. Count to check!
Mathematics. Geometry. 1.0 Children identify and use a variety of shapes in their everyday environment.	FACT: The world is full of many interesting shapes. Learning the names of shapes is a fun way to help children build important geometry skills for school.	TIP: While you're walking, ask about shapes. What shape is the street sign? (Rectangle) The wheels on the car? (Circles) Can you find a triangle together?	GROWTH: Keep learning about shapes to prepare 4K! Now count the sides of the shapes: How many sides does the stop sign have? (8) What shape has 8 sides? (Octagon)
Mathematics: Algebra and Functions. 1.0 Children expand their understanding of sorting and classifying objects in their everyday environment.	FACT: Sorting objects into different groups helps children learn about how things are the same and different. This algebraic concept is a key early math skill.	TIP: During cleanup, ask your child to sort toys into different groups. (Balls, dolls, trucks) Ask: Which toys go together? Why? (They're all trucks)	GROWTH: Keep sorting to prepare 4K! Now ask your child to sort two ways. Can s/he help you sort the laundry by clothing type, like shorts and pants, and by color?
Mathematics. Algebra and functions. 2.0 Children expand their understanding of simple, repeating patterns.	FACT: Learning how to recognize patterns is an important skill in school and life. Copying simple patterns is a big step in being able to recognize patterns.	TIP: At craft time, make a bookmark. Cut a narrow piece of paper and draw a pattern: star-heart-star-heart. Can your child draw the same pattern?	GROWTH: Keep making patterns to prepare 4K! Have your child copy harder patterns, like star-heart-heart-star-heart-heart. Can s/he make his/her own?

Ready4K is a program of ParentPowered Technologies, a Public Benefit Corporation. © 2016

Conclusion

This study contributes to a growing body of evidence that the trusted messenger strategy used by *Too Small to Fail* is an effective strategy to encourage parents to engage in age-appropriate skill building interactions with their young children. Across multiple settings, parents who meet with a trusted messenger report improved knowledge and notable shifts in behavior.

Among parents who participated in the early math initiative at the Children's Health Center, just under half (49%) had heard about the importance of engaging in early math activities with young children, a relatively modest proportion. On the other hand, nearly half of parents in the study (46%) reported that they engaged in daily early math skill building activities like counting objects and talking about shapes, indicating that many were already engaging in early math skill building, even if they didn't perceive it as such.

About two-thirds of parents (67%) said they learned something new from their conversation with their doctor, a substantially larger proportion of parents that reported learning something new in the earlier *Talk, Read, Sing* campaign focused on early literacy skill building at the same clinic (49%). Spanish-speaking parents were particularly likely to report learning something new (73%) than their English-speaking peers (54%), a similar pattern as in the prior study.

Nearly all parents (99%) reported that they planned to use something from the *Talk, Read, Sing* toolkit at home. Moreover, eight in ten parents (79%) enrolled in the Ready4K text service, opting in to receiving additional messages about supporting their child's development.

When contacted a few months later, 95% of parents reported that they remembered talking with their physician about the importance of age-appropriate math skill building activities, suggesting that the brief interaction was memorable.

Moreover, the proportion of parents reporting that they engage in early math activities daily rose to 58% from 46%, a notable increase. Spanish-speaking parents reported the largest change in behavior: the proportion reporting engaging in daily early math activities increased from 41% to 53%.

Taken together, these reports suggest that parents of young children may not yet be aware of the importance of engaging in early math skill building activities, and are open to learning about the topic from a trusted messenger like a physician. Substantial shifts in self-reported behaviors after participating in the early math initiative are especially encouraging, especially among Spanish-speaking parents.

Acknowledgments

Our sincere thanks to all those who were involved in conducting the “Talking is Teaching: Talk, Read, Sing” intervention and evaluation at Zuckerberg San Francisco General Hospital (ZSFG). This work would not be possible without the dedicated leadership team and residents at ZSFG, researchers at Public Profit, and the participating families whose children received care at ZSFG. We are especially grateful to the following people for their commitment and support: Dr. Elena Fuentes-Afflick, Drs. Shonul Jain and Eliza Bakken and Drs. Neeti Doshi and Eleanor Chung, as well as Antonio Hernandez and Serena Ke at ZSFG; and Corey Newhouse and Ava Elliott at Public Profit. We are extraordinarily grateful for the generous gift from Marc Heising and Liz Simons. Without their support, none of this would be possible.

Appendices

The research excerpted in this brief was completed by Corey Newhouse and Ava Elliott at Public Profit. For a copy of the full reports by Public Profit, please contact *Too Small to Fail* at info@toosmall.org

Appendix A: Data Sources

Data Source	Total N	English	Spanish
In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician, and phone-based interviews conducted 8-12 weeks after their conversation.	222	67	155
Enrollment statistics from the Ready4K text messaging platform.	226	69	157
Written survey from parents of young children who did not participate in the intervention.	61	23	38

The evaluation team also transcribed results from the 30-month version Ages and Stages Questionnaire, a developmental screening tool conducted for patients at the Health Center. As no discernible patterns were detected in the results, they are not presented in this brief.

Appendix B: Demographics of Study Participants

Characteristic	Category	Count	Percent
Language of parent/caregiver	English	67	30%
	Spanish	155	70%
Gender of parent/caregiver	Female	202	91%
	Male	20	9%
Age of child	24-35 months	110	50%
	36-47 months	50	23%
	48-60 months	62	28%
Age of parent/caregiver	20-29	78	35%
	30-39	114	51%
	40-49	25	11%
	50+	5	2%
Race/Ethnicity of parent/caregiver	Asian	12	5%
	Black or African American	11	5%
	Latinx	179	81%
	Native Hawaiian or Other Pacific Islander	2	1%
	White	7	3%
	Mixed race or other	11	5%
Parent's level of education	Graduate degree	2	1%
	College graduate	28	13%
	Some college	27	12%
	HS diploma/GED	66	30%
	Less than HS	99	45%
Number of children in household	1-2	78	69%
	3-4	114	29%
	5-6	25	2%
Previously enrolled in Talk, Read, Sing intervention	Yes	72	32%
	No	150	68%

Appendix C: Detailed Survey Results

Have you heard from anywhere about the importance of doing math activities with young children, like counting, looking for patterns, and making shapes?

	Parent's age				Number of children under the age of 18 live in the home		
	20-29	30-39	40-49	50+	1-2	3-4	5-6
No	58%	47%	44%	80%	56%	41%	40%
Yes	42%	53%	56%	20%	44%	59%	60%

Source: In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

What do you do to help your child get ready to be successful in preschool or kindergarten?

	Language		TRS intervention participant?	
	English	Spanish	Yes	No
Talk	30%	24%	33%	22%
Read	64%	57%	65%	56%
Sing songs	37%	28%	39%	27%
Sort shapes	28%	19%	24%	21%
Look for patterns	6%	1%	0%	3%
Measure things (like with cooking)	0%	0%	0%	0%
Count objects	48%	48%	44%	49%
Play card games	6%	1%	1%	3%
Play video games	3%	1%	1%	1%
Watch educational TV	10%	4%	4%	7%
Teach colors	21%	28%	31%	24%
Draw	12%	23%	13%	23%
Write	9%	9%	10%	9%
Other (specify)	54%	31%	40%	37%
N/A – Parent does not do anything to prepare child	0%	0%	0%	0%

Source: In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

Where did you hear about the importance of doing math activities, like counting, looking for patterns, and making shapes?

	TRS participant	TRS non-participant	**Percent**
School or Teachers	24%	31%	**29%**
Preschool/childcare*	3%	23%	**18%**
Doctor	20%	14%	**16%**
Friends and Family	20%	13%	**15%**
Community Health and Education Programs (WIC/Good Samaritan FRC/YMCA etc.)	23%	10%	**14%**
TV*	23%	9%	**13%**
Other	9%	5%	**6%**
Online	3%	3%	**3%**
Radio	0%	0%	**0%**

Source: In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.

**Indicates statistically significant difference in groups.*

How often do you do math activities?

	Language		**TRS participant?**		**Parent's age**			
	English	Spanish	No	Yes	20-29	30-39	40-49	50+
Rarely	2%	3%	3%	3%	1%	4%	0%	0%
Some Days	24%	32%	29%	31%	37%	26%	20%	20%
Most Days	16%	23%	21%	21%	19%	21%	28%	20%
Everyday	57%	41%	45%	46%	41%	47%	52%	40%

	Parent's level of formal schooling completed				
	Graduate degree	College graduate	HS diploma/GED	Less than HS	Some college
Rarely	0%	0%	3%	3%	4%
Some Days	0%	21%	30%	33%	22%
Most Days	50%	21%	23%	21%	15%
Everyday	50%	54%	44%	40%	59%

*Source: In-person interviews conducted in English and Spanish with study participants immediately before and after their conversation about early mathematics skill development with a pediatrician. N = 222; English n = 67, Spanish n = 155.*Indicates statistically significant difference in groups.*

Appendix D: Non-Participant Survey Results

Parents of children ages 24-60 months old who attended other clinics at San Francisco General were asked to complete a brief survey about their attitudes and behaviors. Sixty-one (61) parents completed a survey; 38 completed a survey in Spanish (62% of the sample) and 23 in English. These proportions are roughly equivalent to the parents who met with a pediatrician (70% of whom are Spanish speakers).

When asked, what they do to help their child get ready to be successful in kindergarten, nearly all responding parents reported talking (92%), reading (92%) singing (87%), and counting (80%) with their child. They were less likely to report engaging in other early mathematics activities, such as sorting shapes (39%), looking for patterns (48%) or measuring things (34%).

Spanish-speaking parents were less likely to report doing things like sorting shapes, looking for patterns, playing video games, and watching educational TV than their English-speaking counterparts.

What do you do to help your child get ready to be successful in kindergarten?

	English	Spanish	**Overall**
Talk	96%	89%	**92%**
Read	96%	89%	**92%**
Sing songs	91%	84%	**87%**
Count objects	87%	76%	**80%**
Watch educational TV	83%	53%	**64%**
Look for patterns	61%	39%	**48%**
Play card games	52%	37%	**43%**
Sort shapes	61%	26%	**39%**
Measure things	43%	29%	**34%**
Play video games	39%	13%	**23%**

Source: Survey of non-participant parents whose child visited San Francisco General in Fall 2018. N = 61; English n = 23, Spanish n = 38.

When asked at what age children begin to develop early math skills, non-participating parents as a whole picked “as early as 2 years old” as their most common choice. English-speaking parents were more likely to estimate that children begin building early math skills at birth (22%) than their Spanish-speaking counterparts (5%). On the other hand, Spanish speakers were notably more likely to report that children begin building early math skills at 12 months of age (24%) than English speaking parents (9%). Available evidence doesn’t indicate why this might be the case.

At what age do you think that children begin learning about things like counting, patterns, and shapes?

	English	Spanish	**Overall**
Since birth	22%	5%	**11%**
As early as 12 months old	9%	24%	**18%**
As early as 2 years old	52%	45%	**48%**
Between 3 and 4 years old*	NA	NA	**NA**
At about 5 years old	9%	5%	**7%**

**Omitted from the survey through a formatting error.*

Source: Survey of non-participant parents whose child visited San Francisco General in Fall 2018. N = 61; English n = 23, Spanish n = 38.

The majority of parents reported doing things like counting and making shapes with their child most days (41%) or every day (29%).

How often do you do math activities with your child, like counting, looking for patterns, and making shapes?

	English	Spanish	**Overall**
Rarely	4%	6%	**5%**
Some days	22%	28%	**25%**
Most days	43%	39%	**41%**
Every day	30%	28%	**29%**

Source: Survey of non-participant parents whose child visited San Francisco General in Fall 2018. N = 59; English n = 23, Spanish n = 36.