



# ***Learning How to Improve Retention in WIC***

Results and Insights from Two Experiments  
with Local Agencies in California

---

## **Authors:**

Antonia Violante  
Rebecca Oran  
Anthony Barrows  
Allison Yates-Berg

**May 2020**

# **Acknowledgements**

Many thanks to our partners at the David and Lucile Packard Foundation who helped make this work happen, especially Deborah Kong, Diana Garcia, and Meera Mani.

A special thanks to our project partners, Santa Clara County WIC (SCC) and Watts Healthcare Corporation WIC (Watts). They have provided invaluable support, guidance, and knowledge over the years. We thank them for their continued partnership and expertise throughout this project.

We are also grateful to the California Department of Public Health WIC Division for supporting our work with SCC and Watts, and providing thoughtful feedback on initial drafts of this report.

Thank you to Elise Grinstead and Kate Reynolds for graphic design.

## **Sponsored by The David and Lucile Packard Foundation**

For more than 50 years, The David and Lucile Packard Foundation has worked with partners around the world to improve the lives of children, families, and communities—and to restore and protect our planet.

# **About ideas42**



We are a non-profit looking for deep insights into human behavior—why people do what they do—and using that knowledge in ways that help improve lives, build better systems, and drive social change. Working globally, we reinvent the practices of institutions, and create better products and policies that can be scaled for maximum impact.

We also teach others, ultimately striving to generate lasting social impact and create a future where the universal application of behavioral science powers a world with optimal health, equitable wealth, and environments and systems that are sustainable and just for all.

For more than a decade, we have been at the forefront of applying behavioral science in the real world. And as we've developed our expertise, we've helped to define an entire field. Our efforts have so far extended to 40 countries as we've partnered with governments, foundations, NGOs, private enterprises, and a wide array of public institutions—in short, anyone who wants to make a positive difference in people's lives.

Visit [ideas42.org](https://ideas42.org) and follow [@ideas42](https://twitter.com/ideas42) on Twitter to learn more about our work. Contact us at [info@ideas42.org](mailto:info@ideas42.org) with questions.

# Contents

<b>Executive Summary .....</b>	<b>3</b>
--------------------------------	----------

<b>Background .....</b>	<b>5</b>
-------------------------	----------

Defining the problem .....	5
Designing solutions .....	6
Testing impact .....	9

<b>Insights .....</b>	<b>12</b>
-----------------------	-----------

Account for hidden costs to staff and participant's time.....	12
Prompt immediate action.....	13
Test your personalization.....	13

<b>Conclusion .....</b>	<b>15</b>
-------------------------	-----------

## **Appendices**

Appendix 1: Results of behaviorally designed appointment reminders .....	16
Appendix 2: Results of WIC Roadmap .....	17
Appendix 3: Behaviorally Informed Text Messages .....	18
Appendix 4: SCC WIC Journey .....	20
Appendix 5: Watts WIC Pathway.....	22
Appendix 6: Survey Questions .....	24
Appendix 7: Heterogeneous Treatment Effects of Roadmap.....	25

## **Executive Summary**

---

**T**he United States Department of Agriculture’s (USDA) Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) improves well-being for young children and their families by providing healthful food, breastfeeding support, nutrition education, and health referrals. Evidence shows that WIC works—participation leads to decreased infant mortality, and improved cognitive functioning in young children.<sup>1</sup> **However, although an estimated 14.1 million people were eligible to receive this support in 2017, only 51% participated in the program.**<sup>2</sup> Our earlier research in 2016 identified that when participants don’t attend WIC appointments, or stop participating in the program altogether, it’s not always because they don’t want or need the services. Instead, some participants don’t find the long-term value of the program salient, some are unsure about the purpose of appointments, and some simply forget about preparing to attend their appointments before it’s too late.<sup>3</sup>

Following our 2016 research, we partnered with two local agencies in California, Watts Healthcare Corporation WIC in Los Angeles (Watts) and Santa Clara County WIC in San Jose (SCC), to translate insights from this research into pilot tests. In collaboration with Watts and SCC, we designed, implemented, and tested interventions to improve WIC appointment attendance, which is a necessary step for families to receive their food benefits. Additionally, we designed an intervention specifically to improve families’ attendance at the “recertification appointment” that occurs around the child’s first birthday, a common drop-off point for families nationwide.

**We found that redesigning agencies’ text message appointment reminders with behaviorally informed tactics, such as personalization and loss aversion, boosts appointment attendance, but only when implemented properly.** We found evidence that wrongly customized messages add confusion and worsen appointment attendance; stressing the importance of pilot testing any new messaging before launching it in the field.

To overcome barriers to retaining families in the program, particularly right after their child’s first birthday, we designed a physical roadmap of the WIC experience that was given to participants during their infant enrollment appointment. The roadmap was formatted on a two-sided piece of paper and aimed to reshape WIC participants’ perceptions about the duration and value of the program. We found that the roadmap didn’t move the needle on retention after a year of WIC participation, nor did it improve appointment attendance more generally. We hypothesize that despite strong content, the delivery method proved ineffective for this intervention because it created a burden for staff, who must complete numerous other activities during the appointment. The roadmap also failed to prompt immediate action from participants, and future iterations of the design are needed to correct this.

In addition to these results, our work in the field with Watts and SCC revealed three insights that can be applied to future innovations across WIC programs:

**1. Account for hidden costs to staff and participants' time.**

Adding new components to WIC appointments creates a difficult dilemma for staff: either cut out content from the standard appointment to make time to implement the intervention properly or provide participants with an incomplete explanation of the new material. Additionally, even if staff deliver the intervention to participants as intended, there is risk that participants will not absorb the information as they often must balance taking in all of the new information while attending to one or more young children. Designing interventions to grab participants' attention *passively*, without requiring time or attention from WIC staff, will improve implementation and take-up.

**2. Prompt immediate action.**

Participants experience many hassles in the days leading up to an appointment, such as tracking down necessary documents. Interventions that specifically remind participants what to bring to an appointment in the near future are an effective technique to increase attendance; delivering information with timing in mind outperforms interventions that provide the information about what to bring to appointments many months in advance.

**3. Test your personalization.**

Enhancing messaging to WIC participants with behavioral tactics, such as personalization, can make meaningful improvements in appointment attendance, but only when implemented effectively. We urge proper reconnaissance and pilot testing when using personalization. If messages aren't sent in the intended manner, it can increase confusion and ambiguity among participants.

Overall, our aim is for this paper to serve as a resource for administrators, researchers, and policymakers who seek to improve families' experience and participation in WIC using insights from behavioral science—and ultimately, improve health and well-being for families. Based on our findings to date, we believe that small behaviorally informed changes can create important (and cost-effective) improvements to WIC, but more fundamental program and policy changes will be necessary to achieve larger gains in enrollment and retention.

## **Background**

---

In 2016, ideas42 explored opportunities to enhance the experience of the USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) for eligible and participating families, with the aim of helping more people access resources for their family's health and well-being. Our research took us to WIC clinics and grocery stores, where we learned from observation and conversations with WIC participants about barriers they face to leveraging the benefits of the program.

In 2018, we partnered with two local agencies in California, Watts Healthcare WIC in Los Angeles (Watts) and Santa Clara County WIC in San Jose (SCC), to translate insights from our earlier research into pilot experiments. In collaboration with Watts and SCC, we designed, implemented, and tested interventions to address two top priority issues for both agencies: appointment attendance and families' retention in the program after their infant's first birthday. This paper illustrates the process we used to engineer and test our interventions, and introduces three best practices for researchers and practitioners to consider as they embark on continued experimentation to improve outcomes in WIC.

### Defining the problem

The WIC program improves well-being for young children and their families by providing healthful food, breastfeeding support, nutrition education, and health referrals. Evidence shows that WIC works—participation leads to decreased infant mortality, and improved cognitive functioning in young children.<sup>4</sup> However, **although an estimated 14.1 million people were eligible to receive this support in 2017, only 51% participated in the program.**<sup>5</sup> Furthermore, among those who do participate, there is a consistent trend of dropping off of the program early. Our earlier research in 2016 identified that when participants don't attend WIC appointments, or stop participating in the program altogether, it's not always because they don't want or need the services. Instead, some participants don't find the long-term value of the program salient, some are unsure about the purpose of appointments, and some simply forget about preparing to attend their appointments before it's too late.<sup>6</sup> Administrators at both Watts and SCC were keen to use behavioral design to create solutions that overcome barriers like these to increase engagement in the program. In particular, they wanted to focus on designing solutions to two priority problems at their agencies: appointment attendance and continued program participation after a child turns one.



### **Problem 1:** Appointment attendance

WIC participation requires regular visits to the WIC agency, every one to three months to pick up their food vouchers (or restock their EBT card)<sup>1</sup>, and every six to twelve months for recertification to remain enrolled. These appointments are a crucial channel for staff to provide nutrition education, breastfeeding support, and health referrals. Both SCC and Watts have adopted initiatives to improve appointment attendance at their agencies, including phone and text-based appointment reminders, as well as flexible walk-in policies. However, these measures minimally impacted the missed appointment rate at both agencies. For example, during a several week span in 2018, one in every five participants scheduled for an appointment at SCC did not make it to the WIC agency and lost access to their food benefits and nutrition education.



### **Problem 2:** Retention after one year

In WIC programs across the nation, there is a persistent trend of eligible families dropping off from the program prematurely, usually around the child's first birthday. In 2017, nearly 80% of eligible infants participated in the program across the U.S. Yet only 57% of eligible children over the age of one participated.<sup>7</sup> Many researchers and practitioners have identified the drop-off point for most families as the “recertification” appointment, which requires participants to bring in documents that prove their eligibility for the program, including paystubs and paperwork from doctor's appointments. In an average month, about 365 participants are eligible to recertify at SCC, while about 280 participants are eligible to recertify at Watts. Historically, at both SCC and Watts, around one-third of these participants do not complete the process and lose future benefits.

## Designing solutions

To design solutions for each problem, we used a process of idea generation, selection, and prototyping. For both interventions, we involved WIC administrators at Watts and SCC in all stages of the process, to ensure our interventions would be feasible to implement in their contexts. Ultimately, we engineered one design for each priority problem that was tailored to the unique context of each agency. See [Appendices 3-5](#) for visuals of our final designs.

---

<sup>1</sup> All WIC agencies are mandated to switch from paper vouchers to an Electronic Benefits System (EBT) by 2020. At the time of our experiment, WIC participants in California were still using paper vouchers.

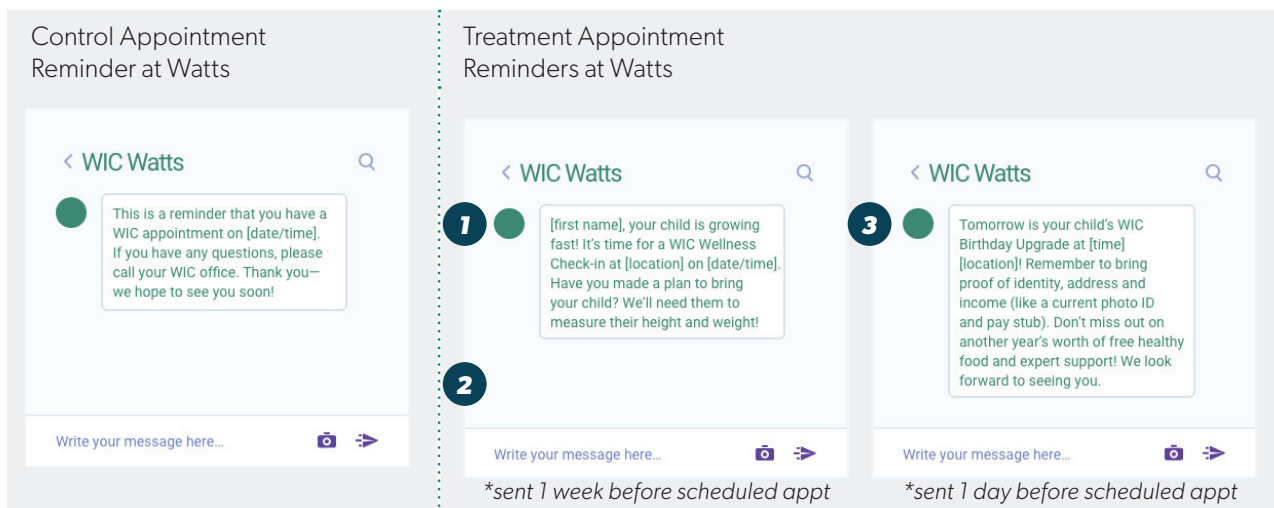


## Problem 1: Appointment attendance

Timely reminders are an important and behaviorally optimized tactic that prompt people to take actions that aren't otherwise salient at the right time. They can be especially helpful for people living in **chronic scarcity** of a key resource, like food or money, since scarcity directs our attention to urgent demands (e.g. paying this month's rent, preparing tomorrow's meals), and limits our capacity to focus on events further in the future (e.g. finding a ride to next week's WIC appointment).<sup>8</sup>

Before our partnership with Watts and SCC, both local agencies had an appointment reminder system in place that sent out generic text message reminders the day before a scheduled appointment. We leveraged three principles from behavioral science to update the appointment reminders to make them more actionable for participants, especially those living in the context of chronic scarcity.

**Figure 1:** Design Features of Behaviorally Informed Appointment Reminders



- 1 **Personalizing** the message by including the specific items participants are expected to bring.
- 2 **Timing** reminders to prompt participants to prepare for appointments a week in advance if planning is required (in addition to another reminder sent the day before the appointment is scheduled).
- 3 **Framing** the benefits using loss aversion to emphasize the immediate value of the appointment.

See our complete text message scripts in [Appendix 3](#).

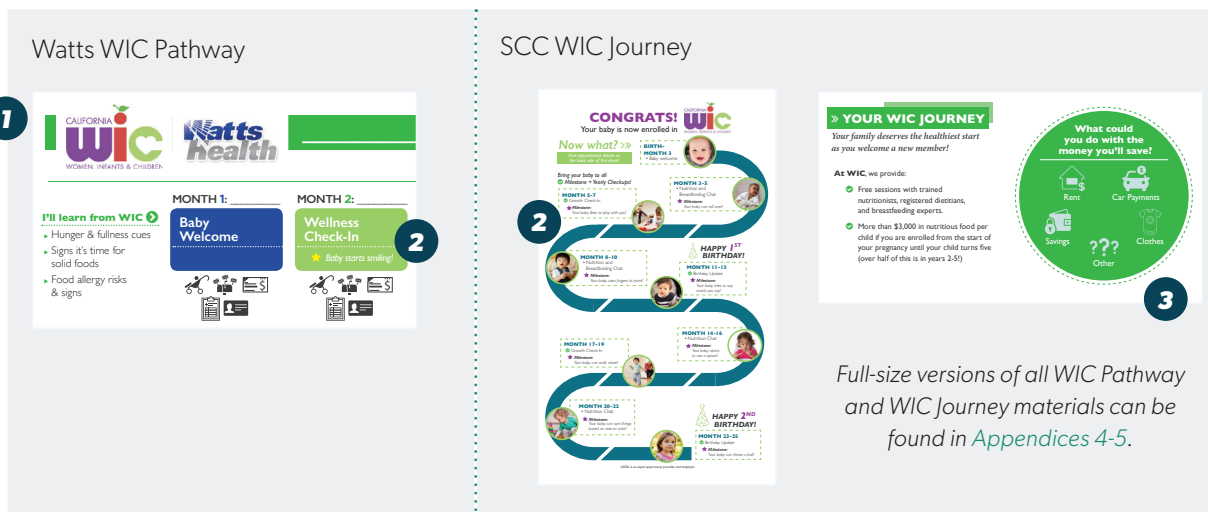




## Problem 2: Retention after one year

To address the behavioral bottlenecks associated with WIC participation after a year, and with attendance at the “recertification appointment” specifically, we designed a “Roadmap” of participation in the program over two years. Staff were trained to introduce families to the Roadmap and walk them through what to expect from WIC in the first two years of program participation during their “infant enrollment” appointment at the WIC agency. The purpose of the Roadmap was to decrease the perceived hassles of the recertification appointment, increase the perceived value of the program, and ultimately boost intentions to remain in the WIC program for longer than a year. The Roadmap aimed to do this by leveraging three key behaviorally informed design features.

**Figure 2:** Design Features of Watts WIC Pathway and SCC WIC Journey



- 1 Simplifying information** about the purpose of upcoming appointments, including icons denoting what items participants are expected to bring with them (the backside of the Pathway included a key defining what each of the icons mean).
- 2 Timing** the program to align with baby development milestones in the first two years of life.
- 3 Enhancing the perceived value** of financial gains made via five-year participation.

## Testing impact

We designed experiments to test the impact of both the redesigned appointment reminders and the Roadmap at Watts and SCC. For the appointment attendance reminders, we randomly assigned individual participants to receive either the behaviorally informed treatment reminders, or continue receiving the same messaging that was used before our project as the control group. Because we relied on staff to deliver Roadmap to participants during their infant enrollment appointment, randomly assigning individual participants to receive the treatment would have been too burdensome for staff to accomplish with high fidelity. Instead, we opted to randomly assign entire clinics (e.g. Compton or Sunnyvale) to be a treatment site that gave out the Roadmap, or a control site that continued infant enrollment appointments as usual.<sup>ii</sup>



### Problem 1: Appointment attendance

All participants who had an appointment scheduled in October 2018 at Watts, and March 2019 at SCC, and who had already opted to receive text message appointment reminders, were randomly assigned to the treatment or control group.<sup>iii</sup> To distinguish the impact of the

appointment reminder texts from the impact of the WIC Roadmap's impact, we excluded anyone who was in the treatment or control group for the WIC Roadmap evaluation from the text reminder evaluation. Across both the treatment and control group, our sample included 3,043 participants from Watts and 3,398 at SCC. **Over a three-month period at Watts, the redesigned appointment reminders increased appointment attendance by 3%, equivalent to helping 45 additional families recertify for the program.** At SCC, due to an implementation snag, the reminders improperly prepared participants for their appointments—for example, by suggesting they bring in documents that weren't actually necessary for their appointment. This resulted in a 4% decrease in appointment attendance. Together, these results present clear evidence that subtle barriers like ambiguity or confusion—impact appointment attendance, and tools from behavioral science can be used to improve WIC program engagement.

#### **-4% Attendance**

from broken SMS vs. standard SMS

#### **+3% Attendance**

from behavioral SMS vs. standard SMS

<sup>ii</sup> To improve our power, we matched the clinics into pairs based on similarities across a variety of characteristics that may impact recertification rates, including: language, breastfeeding status, and rate of missed appointments. Within a matched pair, sites were randomly assigned to either treatment or control.

<sup>iii</sup> The proportion of participants receiving text reminders at Watts was ~80% at the time of our intervention. We estimate that ~75% of participants were receiving text-based reminders at SCC at the time of our intervention based on a comparison of overall caseload and number of participants in our sample for the text-reminder intervention.



## Problem 2: Retention after one year

The rollout of the Roadmap began in April 2018 at Watts and June 2018 at SCC.<sup>iv</sup> Over a three-month period, staff in the treatment sites provided the Roadmap to all participants attending their infant enrollment appointment. Across both the treatment and control group, the sample included 506 infants at Watts and 792 infants at SCC. We found the Roadmap was unsuccessful at increasing retention when the infant turned one year old, or improving appointment attendance more generally. While the results are disappointing, this experiment provides useful information for future interventions—especially the need to be tightly focused on the worker experience when designing programming changes.

<b>Treatment</b> Tully Basom Milpitas	<b>Control</b> Sunnyvale East Valley Gilroy Mediplex	<b>Treatment</b> Watts Compton	<b>Control</b> Huntington Park Adams
<b>Santa Clara</b> (503 infants, June - August 2018)		<b>Watts</b> (506 infants, April - June 2018)	

Additionally, we investigated the theory of change for the Roadmap using surveys to capture participants' perceptions of the costs/benefits of WIC and their confidence in how to navigate the program. The surveys yielded valuable insights. At SCC, 549 participants received and responded to the survey directly after the infant enrollment appointment while at Watts, 157 participants responded to the survey during the infant's six-month appointment. Our findings confirmed what we expected from taking a behavioral science lens to the problem of early drop out—very few families in the control group (4%) indicated that they planned on leaving the WIC program after they turned one. **While recognizing that participants may have been less likely to report early drop off intentions in the survey, as they recorded their responses in front of WIC staff during their appointment, the findings bolster evidence that one-year participation in the WIC program is not a calculated choice made by families at the onset of enrollment, but a consequence of the barriers they experience along the way.** Additionally, when we asked participants where they kept the Roadmap in follow up conversations, most reported they no longer knew, or have not taken it out of their WIC folder since receiving it. We expect these participants did not consult the Roadmap when they were taking active steps to prepare for appointments; the time it helps them most.

» Survey results found that **only 4%** of families plan to leave the WIC program after infant turns one.

<sup>iv</sup> There was one site at Watts, Hoover, that was excluded because a different intervention aimed to improve retention launched there just before the Pathway was rolled out, which would have biased our evaluation.

## Conclusion

These results add nuance to two high priority issues for WIC Program administrators—appointment attendance and one-year retention in the program. These interventions found that behaviorally designed text message appointment reminders can cost-effectively increase appointment attendance, and that subtle barriers, like ambiguity or confusion, can reduce appointment attendance. Although the Roadmap was unsuccessful at improving infant recertification, our surveys point to a clear intention-action gap—the majority of families who drop out of the program early did not report intentions to drop out in advance. Together, these findings provide evidence that when it comes to decisions and actions in WIC, the context of the communications sent to families matters a great deal. Furthermore, leveraging behavioral science to make more direct changes to the context of WIC—including where and when participants enroll in the program, shop for WIC foods, and apply lessons learned from nutrition education—is needed to substantially increase program participation.

## >> Insights

In reflecting on the key differences between the two interventions, and the results of the impact evaluation, we distilled three best practices for researchers and practitioners to consider when designing and implementing interventions in WIC.



### Account for hidden costs to staff and participant's time.

WIC appointments are commonly used as a channel for connecting participants to new materials, resources, and information. This seems to be for good reason—WIC appointments are a requirement that all participants must partake in. However, adding new material to an appointment disrupts a delicate balancing act for staff. Federal and state regulations mandate staff to build participant trust, obtain required information, and assess and address client needs all in a limited amount of time. ***If inadequately integrated into staff routines, newly added material can burden staff with a difficult dilemma: cut content from the standard appointment to make time to fully explain the new intervention or provide an incomplete explanation of the Roadmap to participants.***

Second, participants often multi-task during appointments; they are often interacting with the WIC staff while attending to one or more young children. Even if staff are able to communicate the intervention effectively to participants, it is unreasonable to expect that participants will be able to absorb any additional information squeezed into this moment of information overload.

As a result, interventions during WIC appointments may not always lead to successful delivery. Instead, it's important to consider new ways to design and deliver interventions *passively* to participants. For example, while the Roadmap required five to ten minutes of explanation from staff and attention from participants, more direct changes to the context, such as allowing WIC agencies to provide childcare service in WIC clinic waiting rooms, can be sustained without persistent added efforts from staff. ***Additionally, rather than thinking about a delivery channel as a last-minute addition to a carefully crafted intervention, it's important to recognize the delivery channel as core to the design.***

Examples of delivery channels interventions include using video conferencing to conduct WIC appointments or creating an online portal that allows families to enroll in WIC or schedule appointments online—both of which could improve participant engagement in the program without adding any significant burden to the workflow of staff beyond startup costs. Reducing the cognitive costs of delivering an intervention is key to successful implementation, even if an intervention appears to be simple. We learned this lesson the hard way, as we and our agency partners underestimated the burden of the Roadmap even though we designed it in partnership with agency staff and participants.



## Prompt immediate action.

The Roadmap aimed to improve appointment attendance by reframing the value and clarifying the purpose of appointments, and by making it clear how to prepare for each appointment in advance. We found that this strategy was less effective at increasing appointment attendance than brief text message reminders sent to participants one week before and one day before their appointments. Synthesizing these results, we infer that recertification-related hassles are experienced in the days or hours leading up to the appointment, rather than anticipated over time. This conclusion aligns with the “scarcity”<sup>9</sup> framework, which states that families living with low incomes make decisions based on a series of day-to-day urgent demands. ***It’s important to design the timing and delivery channel of interventions to be salient to participants when they are actually in a position to act on the behaviors that help them reap benefits—no more than a week in advance.***

Future research can continue exploring the use of well-timed reminders across the context of WIC. For example, timely reminders could be used to notify participants about available foods remaining in their balance in the days before their benefits expire. ***A different, promising tactic for prompting participants to maximize the benefits of the program at the right time is creating channels for families to access WIC in spaces where they interact with the program beyond the clinic itself.*** Two examples are offering virtual, on-the-spot enrollment for participants who are referred to WIC while at the doctor’s office, and creating a WIC-only aisle for participants navigating their food package in grocery stores. While not all of these examples are currently allowable, modifying regulations and policies to allow for additional flexibility would help to increase access to and uptake of the WIC program.



## Test your personalization.

Messaging doesn’t just need to be timely, it also has to feel relevant; this is why personalization matters so much. We found that incorporating personalization into the messaging of text message appointment reminders was successful at boosting appointment attendance at Watts. However, what remains unclear is how the impact of personalization stacks up against other behavioral science-informed techniques, such as ***loss aversion***—framing experiences as losses rather than gains—or ***planning prompts***—encouraging commitment to specific steps in a process. Future research focused on this question is important because not all techniques incur the same risks and costs. In particular, personalization is difficult to implement, and can backfire if executed poorly. We saw this at SCC, where there was a significant decrease in appointment attendance due to an implementation error that led people to receive messages that weren’t properly

customized—for example, suggesting that they bring in documents that weren't actually necessary for their appointment.

***Our takeaway is that personalization can be effective, but it's important to do proper reconnaissance of the administrative data systems and create opportunities for pilot testing before using it as a tool in the WIC context.***

While exercising caution, we encourage continued efforts to use available data to personalize the WIC experience in new and creative ways. For example, we see promise in future work that applies personalization across many aspects of the WIC experience—such as generating recipe recommendations for participants based on past purchases at the grocery store, or tailoring nutrition education modules based on if someone is new to the program or has been using it for a few years.

***Considering that personalization may not always be a viable tool to use, another area ripe for further research is continued exploration in how alternative behavioral science-backed tactics can spark action from WIC participants.***

For example, *social influence*—or prompting people to be cognizant of the beliefs and behaviors of their peers—has been found to be a successful tactic to increase civic engagement. Future work could explore opportunities to apply social influence in the WIC context, including interventions that prompt staff at community service organizations or doctor's offices (that have access to someone's eligibility information), to refer families to WIC.

## **Conclusion**

---

**W**hen people don't use the services provided by WIC, either by missing appointments or stopping program participation prematurely, it's not always because they don't want or need them.



Sending SMS reminders with personalized information about what to bring to appointments boosts attendance.

If this were true, we'd expect that the way we communicate with participants about upcoming appointments wouldn't make any difference to their attendance. Instead, the results of our appointment reminders experiment with Watts and SCC find just the opposite. Sending SMS reminders with personalized information about what to bring to appointments boosts attendance. If the messages are crafted improperly and communicate wrongly customized information about what to bring to appointments, appointment attendance decreases. ***In short, the way WIC agencies communicate with their participants does matter, and enhancing messaging with behavioral design (and proper pilot testing) can make real differences in program participation.***

An additional lesson learned from this pilot is that the channel used to deliver materials to participants is more important than it may seem. We imagine that the WIC Roadmap could be more successful as a series of reminders to participants about the long-term value of WIC and its alignment with a child's development, in addition to timely reminders of what to bring to appointments in the days before they are scheduled (rather than months in advance).

However, the insights from our work aren't limited solely to the optimization of WIC agency communications. We can imagine bigger and bolder improvements in program participation with smart policy redesign that removes hidden costs to participants' time and attention, and empowers participants to use the benefits of the program in ways that they know are best for their families. For example, the number of participants exiting the program prematurely would likely decrease if the infant's or child's WIC eligibility were to extend until the fifth birthday, eliminating time and attention spent tracking down pay stubs and reports from doctor's offices. Likewise, giving families the flexibility to personalize when they redeem food benefits, rather than prescribing that they only use one month's benefits at a time, could allow families to both take advantage of bulk purchases (which are overall cheaper) and buy more when their family needs healthy foods the most, such as after a job layoff or to stock up in preparation for a natural disaster. Overall, reforming the program to create slack for families living in a context of uncertainty, identifying and removing aspects of the program that cost participants significant amounts of time and attention, and creating a dignified user-experience for participants will be the most reliable way to increase long-term participation and reduce the drop in participation at the one-year mark nationwide.



# Appendices

## Appendix 1: Results of behaviorally designed appointment reminders

Timely, personalized reminders increased appointment attendance at Watts. When participants were sent a text reminder about their upcoming appointment using behaviorally informed language, they were 3% ( $p < 0.01$ , CI's [.003, 0.060]) more likely to come to their appointment compared to participants who were sent a reminder with generic information.

	Watts - Attendance		Santa Clara - Attendance	
	(1)	(2)	(1)	(2)
Treatment	0.0445***	0.0315**	-0.0385**	-0.0388**
	(0.002)	(0.029)	(0.017)	(0.016)
Controlled for clinics	No	Yes	No	Yes
Constant	0.775***	0.790***	0.738***	0.762***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3043	3019	3398	3398
R-SQ	0.003	0.008	0.002	0.012

\*\*\* -  $p < 0.01$  \*\* -  $p < 0.05$  \* -  $p < 0.10$

*P-values in parentheses. We tested the impact of our intervention with a linear regression using two models. In Model 1, we regressed treatment on appointment attendance with no controls. In Model 2, we controlled for variation between clinics (24 participants at Watts did not have data for their clinic ID). All other covariates were balanced across treatment and control, and therefore not included in our regression model.*

## Appendix 2: Results of WIC Roadmap

The Journey/Pathway did not increase recertification appointment attendance. The Pathway had no impact on recertification attendance at Watts ( $p=0.19$ , CI's  $[-0.01$  to  $0.04]$ ). The Journey decreased recertification attendance at SCC by 9% ( $p<0.01$ , CI's  $[-0.10$  to  $-0.085]$ ).

	Watts - Attendance			SCC - Attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
Treatment	-0.0104	-0.00221	0.0152	-0.034	-0.094***	-0.093***
	(0.643)	(0.663)	(0.19)	(0.395)	(0.000)	(0.000)
Matched pairs	No	Yes	Yes	No	Yes	Yes
Unbalanced covariates	No	No	Yes	No	No	Yes
Constant	0.769***	0.786***	0.725***	0.581***	0.641***	0.574***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	506	506	506	792	792	792
R-SQ	0.000	0.002	0.018	0.011	0.005	0.02

*p-values in parentheses; \*\*\* -  $p<0.01$  \*\* -  $p<0.05$  \* -  $p<0.10$*

*P-values in parentheses. We tested the impact of our intervention with a linear regression using three models. In Model 1, we regressed treatment on appointment attendance and clustered standard errors by agency site to improve our power, since we randomized our intervention at the site level. In Model 2, we ran the same regression as Model 1, with the addition of controlling for the matched pairs as a proxy for clinic variation. In Model 3, we clustered standard errors, controlled for matched pairs, and also controlled for additional unbalanced covariates.*

## Appendix 3: Behaviorally Informed Text Messages

Appointment Type	Timing	SCC Message	Watts Message
Voucher pick up / Nutrition in Action	1 week before (morning)	Hi [first name], your WIC Nutrition Chat is coming up on [date/time] at [location]. Coming in on time means less waiting! If you can't make it, give us a call at 408-792-5101 and we can help find another time that works for you.	Don't miss out on your WIC checks! Your Nutrition in Action appt is coming up next week on [date/time]. Text back if you need to reschedule!
	1 day before (afternoon)	Your WIC Nutrition Chat is tomorrow at [date/time] at [location]. Don't miss out on healthy food vouchers and expert WIC support! One visit means months of benefit for your family.	Reminder: Your Nutrition in Action appt is tomorrow [date/time]. One visit means expert support and food savings for you and your growing family!
Breastfeeding Chat / Mommy Wellness Chat	1 week before (morning)	Hi [first name], your WIC appointment with a breastfeeding expert is coming up on [date/time] at [location]. Remember to bring your baby along! If you can't make it, give us a call at 408-792-5101 and we can help find another time that works for you.	
	1 day before (afternoon)	Your WIC breastfeeding appointment is tomorrow at [date/time] at [location]. By breastfeeding you are making the best choice for the health and wellbeing of you and your baby. See you and your baby tomorrow!	Your Mommy Wellness Check is [date/time]! Remember to bring your proof of identity, income, and address. See you soon!

Appointment Type	Timing	SCC Message	Watts Message
Growth Check-in	1 week before (morning)	[first name], your child is growing fast! It's time for a Growth Check-in at [location] on [date/time]. In this appointment we will check up on how your child is growing so remember to bring your child along! If you can't make it, give us a call at 408-792-5101 and we can help find another time that works for you.	[first name], your child is growing fast! It's time for a WIC Wellness Check-in at [location] on [date/time]. Have you made a plan to bring your child? We'll need them to measure their height and weight!
	1 day before (afternoon)	Your WIC Growth Check-In is tomorrow at [date/time]. Make sure to bring your child, we'll be measuring their height and weight!	Reminder: Your WIC Wellness Check-in is [date/time]. Remember to bring your child or a WIC referral with current height and weight. See you soon!
Birthday Update / Birthday Upgrade	1 week before (morning)	Hi [first name], your child's Birthday Update is coming up on [date/time] at [location]. Remember to bring proof of identity, address and income (for example a current photo ID and pay stubs). Give us a call at 408-792-5101 if you have any questions!	It's birthday time! Your child's WIC Birthday Upgrade is one week away on [date/time]. Text back for details on what to bring for this appt.
	1 day before (afternoon)	Hi [first name], your child's Birthday Update is tomorrow at {Time} at {Location}. Make sure to come in so that you can continue to get free healthy food and expert support for another year.	Tomorrow is your child's WIC Birthday Upgrade at [time] [location]! Remember to bring proof of identity, address and income (like a current photo ID and pay stub). Don't miss out on another year's worth of free healthy food and & expert support! We look forward to seeing you.

## Appendix 4: SCC WIC Journey

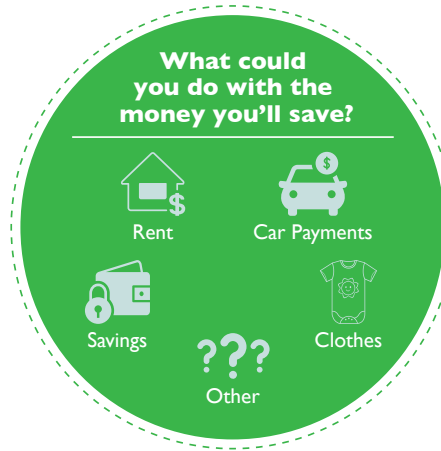


## » YOUR WIC JOURNEY

*Your family deserves the healthiest start as you welcome a new member!*

**At WIC,** we provide:

- ✓ Free sessions with trained nutritionists, registered dietitians, and breastfeeding experts.
- ✓ More than \$3,000 in nutritious food per child if you are enrolled from the start of your pregnancy until your child turns five (over half of this is in years 2-5!)



## » WIC APPOINTMENT TYPES

Appointment	Brief Description	What should you bring?
Nutrition Chat	<ul style="list-style-type: none"> <li>▶ Expert nutrition tips for you and your growing baby!</li> <li>▶ Pick up your voucher for free healthy food</li> </ul>	▶ Just your WIC folder
Breastfeeding Chat	▶ Meet with a WIC breastfeeding expert one on one	▶ Your WIC folder and your baby
Growth Check-in	<ul style="list-style-type: none"> <li>▶ Find out how your baby is growing!</li> <li>▶ Pick up your voucher for free healthy food</li> </ul>	▶ Your WIC folder and your baby
Birthday Update	<ul style="list-style-type: none"> <li>▶ Renew your participation in the program for the next year</li> <li>▶ Pick up your voucher for free healthy food</li> </ul>	<ul style="list-style-type: none"> <li>▶ Your WIC folder and your baby</li> <li>▶ See checklist below</li> </ul>

## » WHAT DO I NEED FOR THE BIRTHDAY UPDATE?

**Most people bring:**

- ☐ Current Photo ID with Current Address:  
(as proof of address and identification)
- ☐ Medi-Cal Card OR Pay Check Stubs:  
(as proof of income)
- ☐ Health Information:

---



---



---

**\*\*Remember to also bring your child!**





*Ask a WIC staff member if you need an alternative to the documents suggested!*

If you forget a document, you will need to return to the WIC office to bring it within the next month.

**Avoid this by bringing everything you need the first time!**










USDA is an equal opportunity provider and employer.

## Appendix 5: Watts WIC Pathway

### \_\_\_\_\_'S PATH TO HEALTHY DEVELOPMENT

Welcome to WIC! We're excited to start this journey together!












	MONTH 1:	MONTH 2:	MONTH 3:	MONTH 4:	MONTH 5:	MONTH 6:
<b>I'll learn from WIC</b> <ul style="list-style-type: none"> <li>▶ Hunger &amp; fullness cues</li> <li>▶ Signs it's time for solid foods</li> <li>▶ Food allergy risks &amp; signs</li> </ul>	<b>Baby Welcome</b> 	<b>Wellness Check-In</b> ★ Baby starts smiling! 		<b>Nutrition in Action</b> ★ Baby starts babbling! 		<b>Wellness Check-In</b> ★ Baby rolls over! 
<b>I'll learn from WIC</b> <ul style="list-style-type: none"> <li>▶ How to start soft solid foods</li> <li>▶ My baby's self-feeding progress</li> </ul>			<b>Nutrition in Action</b> ★ Baby sits on his/her own! 		<b>MONTH 10:</b> 	<b>MONTH 12: Birthday Upgrade!</b> ★ Baby tries to say words you say! 
<b>I'll learn from WIC</b> <ul style="list-style-type: none"> <li>▶ How to prevent anemia</li> <li>▶ How to bottle wean</li> <li>▶ Healthy recipes using my child's favorite foods</li> </ul>					<b>MONTH 17:</b> 	<b>Wellness Check-In</b> ★ Baby walks alone! 
<b>I'll learn from WIC</b> <ul style="list-style-type: none"> <li>▶ Healthy snack ideas</li> <li>▶ Oral care tips</li> <li>▶ My child's growth and nutritional progress</li> </ul>			<b>Nutrition in Action</b> ★ Baby can use a spoon to eat! 		<b>MONTH 22:</b> 	<b>MONTH 24: Birthday Upgrade!</b> ★ Baby speaks in sentences! 

★ = Growth Milestone

### See what's next to help your child grow and thrive!

USDA is an equal opportunity provider and employer.

## ➤ What should I know about my appointments?

Appointment Type	What is it about?	Notes
<b>Baby Welcome</b>   	<ul style="list-style-type: none"> <li>▶ Enroll your new baby in WIC to start on the path to a healthy and bright future!</li> <li>▶ Learn about what's in store for your child in WIC</li> </ul>	 Medical/health information: <input checked="" type="checkbox"/> Baby's birth height and weight  
<b>Wellness Check-In</b>   	<ul style="list-style-type: none"> <li>▶ Talk with a WIC counselor about how your child is growing and developing</li> </ul>	 Medical/health information for <b>Month 2</b> : <input checked="" type="checkbox"/> Mother's current height, weight, and postpartum hemoglobin result  
<b>Nutrition in Action</b> 	<ul style="list-style-type: none"> <li>▶ Learn important tips about feeding and raising your child to be healthy and strong!</li> </ul>	 Medical/health information for <b>Months 6 &amp; 18</b> : <input checked="" type="checkbox"/> Your child's recent height and weight  
<b>Birthday Upgrade</b>   	<ul style="list-style-type: none"> <li>▶ Renew your child's WIC benefits for another year</li> <li>▶ Upgrade to a food package that supports your child's new nutrition needs!</li> </ul>	 Medical/health information: <input checked="" type="checkbox"/> Your child's hemoglobin results  

**Remember to bring required items for your appointments so that you don't have to make extra visits!**

## ➤ What do I need to bring? ➤ What will I see on my path?

	What are my options?
My child/ren 	Bring _____ to this appointment!
Proof of address 	<b>Bring one:</b> <ul style="list-style-type: none"> <li>▶ CA ID or Driver's License</li> <li>▶ Mail (Post card, junk mail, etc.)</li> <li>▶ Utility Bill (Gas, light, water, or trash)</li> </ul>
Proof of income 	<b>Bring one:</b> <ul style="list-style-type: none"> <li>▶ Medi-Cal Card</li> <li>▶ Recent Paycheck Stubs</li> <li>▶ CalWORKS Notice of Action</li> <li>▶ CalFresh Benefits Notice</li> <li>▶ Child Support</li> <li>▶ Disability Payments</li> <li>▶ Financial Aid</li> <li>▶ Unemployment</li> </ul>
Medical/health information 	<b>This is specific to the appointment.</b> <ul style="list-style-type: none"> <li>▶ Check the "Notes" boxes in the next chart and talk to your WIC Counselor about the medical/health information to bring.</li> </ul>
For identification (ID) 	<b>Bring one:</b> <ul style="list-style-type: none"> <li>▶ Any Picture ID</li> <li>▶ Birth Certificate</li> <li>▶ Social Security Card</li> </ul>



## Appendix 6: Survey Questions



Thank you for taking this survey. Learning from you will help us to improve the WIC program!

**This is a ten-question survey, which should take you less than 5 minutes.** We will never ask for your name or any other personal information and you have the option to skip a question or stop at any time.

- 1.** What WIC office location do you go to?  
(Circle One)
  - A.** Tully (500 Tully Road)
  - B.** East Valley (1993 McKee Road)
  - C.** Gilroy (7475 Camino Arroyo)
  - D.** Bascom (2406 Clove Drive)
  - E.** Sunnyvale (660 S. Fair Oaks Avenue)
  - F.** San Jose Downtown (725 E. Santa Clara Street)
  - G.** Milpitas (143 N. Main Street)
- 2.** How long do you plan for your youngest child to participate in WIC? (Circle One)  
Until your child is:
  - A.** 6 months old (or younger)
  - B.** 1-year old
  - C.** 2-years old
  - D.** 3-years old
  - E.** 4-years old
  - F.** 5-years old
- 3.** How easy or hard was it to come to today's WIC appointment? (Circle One)
  - A.** Very easy
  - B.** Not bad
  - C.** A big hassle

▶ (Optional) Explain:

\_\_\_\_\_

\_\_\_\_\_
- 4.** How easy or hard was it to bring all the documents you needed for your appointment today? (Circle One)
  - A.** Very easy
  - B.** Not bad
  - C.** A big hassle

▶ (Optional) Explain:

\_\_\_\_\_

\_\_\_\_\_
- 5.** As you know, WIC provides access to free healthy food. How often do you think about this benefit from WIC? (Circle One)
  - A.** Once a day
  - B.** Once a week
  - C.** Once a month
  - D.** I rarely think about the WIC food benefit.
- 6.** As you know, WIC staff provide nutrition information as part of the program. How often do you use nutrition information learned at WIC? (Circle One)
  - A.** Once a day
  - B.** Once a week
  - C.** Once a month
  - D.** I rarely use nutrition information learned at WIC.
- 7.** How often have you met with WIC breastfeeding expert or peer counselor?
  - A.** Never
  - B.** Once or twice
  - C.** Three times or more
  - D.** I formula feed (skip to question 9).
  - E.** I did not know WIC had a breastfeeding expert.
- 8.** How often have you used information you learned at WIC when you breastfeed? (Circle One)
  - A.** Once a day
  - B.** Once a week
  - C.** Once a month
  - D.** I rarely use breastfeeding information from WIC.
- 9.** Circle True or False for each sentence.

*I know what to expect from WIC appointments.* (Circle One)
  - A.** True
  - B.** False

*I feel comfortable asking questions to WIC staff.* (Circle One)
  - A.** True
  - B.** False

*Every WIC appointment is helpful.* (Circle One)
  - A.** True
  - B.** False
- 10.** When your child turns one, you will be asked to bring in a few documents to check eligibility for the next year. How easy or hard do you think it will be for you to bring the documents for this appointment? (Circle One)
  - A.** Very easy
  - B.** Not bad
  - C.** A big hassle

## Appendix 7: Heterogeneous Treatment Effects of Roadmap

	SCC - Recertification		Watts - Recertification	
	(1)	(2)	(1)	(2)
Treatment X	-0.0455	-0.0269	-0.0682	-0.0672
Full BF	(0.722)	(0.836)	(0.383)	(0.399)
Treatment X	-0.167	-0.154	-0.0111	0.00673
Full Formula	(0.161)	(0.202)	(0.627)	(0.773)
Treatment X	0.0944	0.0927	-0.0344	-0.357
Spanish	(0.220)	(0.253)	(0.427)	(0.411)
Treatment X	0.0933	0.0861	----	----
CalFresh	(0.332)	(0.369)		
Matched pairs	No	Yes	Yes	No
Constant	0.863***	0.892***	0.698***	0.718***
	(0.000)	(0.000)	(0.000)	(0.000)
N	503	503	506	506
R-SQ	0.028	0.028	0.018	0.018

## Endnotes

<sup>1</sup> Carlson and Neuberger (2017). WIC Works: Addressing the Nutrition and Health Needs of Low-Income Families for 40 Years, Center on Budget and Policy Priorities.

<sup>2</sup> National-and-state level estimates of WIC eligibility and program reach in 2017 (Summary), *United States Department of Agriculture*.

<sup>3</sup> Grodsky, Violante, Barrows, and Gosliner (2017). Using Behavioral Science to Improve the WIC Experience: Lessons from the Field in San Jose, California, ideas42.

<sup>4</sup> Carlson and Neuberger (2017). WIC Works: Addressing the Nutrition and Health Needs of Low-Income Families for 40 Years, Center on Budget and Policy Priorities.

<sup>5</sup> National-and-state level estimates of WIC eligibility and program reach in 2017 (Summary), United States Department of Agriculture.

<sup>6</sup> Grodsky, Violante, Barrows, and Gosliner (2017). Using Behavioral Science to Improve the WIC Experience: Lessons from the Field in San Jose, California, ideas42.

<sup>7</sup> National-and-state level estimates of WIC eligibility and program reach in 2017 (Summary), United States Department of Agriculture.

<sup>8</sup> Daminger et al (2015). Poverty Interrupted: Applying Behavioral Science to the Context of Chronic Scarcity, ideas42.

<sup>9</sup> Daminger et al (2015). Poverty Interrupted: Applying Behavioral Science to the Context of Chronic Scarcity, ideas42.

<sup>10</sup> Daminger et al (2015). Poverty Interrupted: Applying Behavioral Science to the Context of Chronic Scarcity, ideas42.

