The Recycling Partnership
Solving for Circularity

Center for Sustainable Behavior & Impact

Studying Recycling Behavior and Participation with In-Home Recycling Bins

How Providing In-Home Recycling Bins to Residents Could Increase Recycling Participation

Cincinnati, OH • 2022

Access to recycling is the first step in the recycling journey. In Cincinnati, Ohio, all single-family households and multi-unit complexes with four units or less that receive curbside garbage collection are eligible for curbside recycling. Once access is established, many communities then look to continually improve participation and capture quality recyclable materials.

In 2021, The Recycling Partnership conducted a participation study in Cincinnati, and we saw some promising results among households that requested in-home bins. To further research, in 2022, we adjusted our tactics to determine if more educational mailers, in addition to the in-home recycling bins, would improve participation.

The Recycling Partnership is grateful for the generosity of the City of Cincinnati for their collaboration on this project and graciously offering their staff time, resources, and ideas to strengthen this study. Without their partnership, this would not have been possible.

Key Takeaways

Across the intervention group **there was a statistically significant increase in recycling set out**, with the greatest increase coming from the group that requested an in-home recycling bin.

Households that were not participating in recycling and requested an in-home bin had an average set-out rate increase that was 2.4 times greater than the control. This is an impressive increase because it requires the **most significant change in behavior to move from a non-recycler to setting out recycling**.

Residents that received an in-home recycling bin universally as part of the 2021 participation study still use the bin to collect recycling in their household over one year later. This highlights the potential of in-home bins for increasing participation and capture over time.

20% OF RESIDENTS REQUESTED AN IN-HOME RECYCLING BIN AFTER RECEIVING A MAILING OFFERING THE BINS.

Study Design & Implementation

The goal of this study was to explore the potential impact that in-home recycling bins, provided to residents who take the action of making a request, combined with educational and motivational information has on single-family households recycling participation.

The Recycling Partnership conducted a residential recycling participation study in Cincinnati in 2021 in neighborhoods with average and below-average set-out rates. The 2021 study included both the universal distribution of in-home recycling bins for select routes and the delivery of bins to households that submitted a request for other routes. The initial study's results showed that the greatest increase in participation occurred among households that took the action of requesting a bin, suggesting that, to increase participation most efficiently, free bin distribution programs may benefit from an 'opt-in' structure. To explore this hypothesis, our second study in 2022 focused on this intervention strategy.

Community Program Snapshot	
Single-Family Households	105,000
Cart size	96-gallon
Universal or Opt In	Universal
Collection Frequency	Every other week
Recycling Type	Commingled
Population	308,935

In this 2022 study, select single-family routes received a mailer that encouraged residents to request an in-home recycling bin either by business reply mail, online, or over the phone. Households that requested a bin were then delivered one, accompanied by educational information on how to use the bin to collect recyclable materials.

Historical participation data, along with average household income and education level, were all considered when selecting routes to receive the intervention as part of this study. Routes selected for the intervention group had a set-out rate between 20—50%, based on 2021 set-out data. The routes also represented a range in average household income and level of education from the U.S. Census Bureau's 2019 American Community Survey 5-Year Estimates.

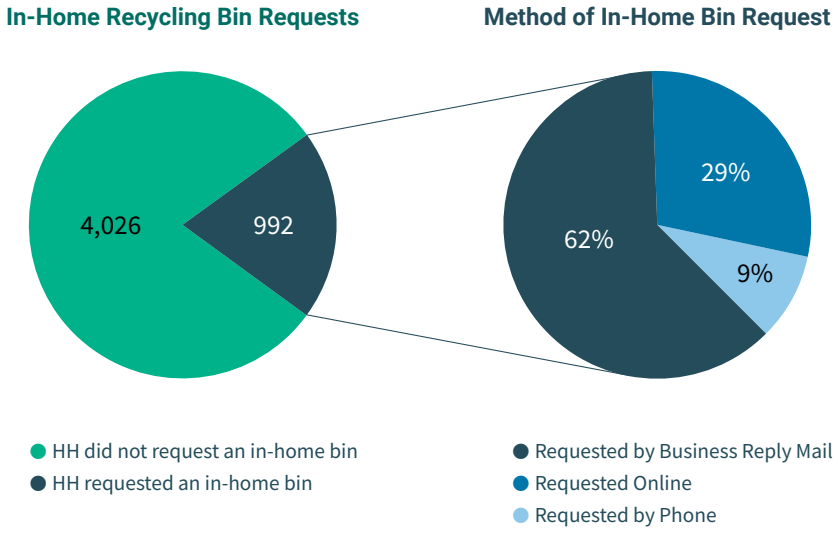
2022 Intervention Summary

All households on the selected routes, excluding a control route, received an initial mailer that encouraged residents to request an in-home recycling bin either by business reply mail, online, or over the phone. The business reply mailers were easy-to-use and return as residents needed only to tear off the pre-completed request and drop the postage-paid card in the mail.

Households that requested a bin were then delivered one within three to five weeks of the request, accompanied by information educating households on how to use the bin to capture recyclable materials. These households, along with all the other households that did not request a bin, were then delivered four separate follow-up mailers each mailed one month apart.

Our past research has shown that one mailing is not enough to drive increases in participation. In this study, we wanted to test the potential impact of multiple mailers on recycling participation and include two reminders of the collection schedule.

The intervention was deployed over six months in May through December of 2022. **A total of 5,018 single-family households were educated as part of this study with 4,170 households in the control group.** Twenty percent of the households that received a mailing offering an in-home recycling bin requested and received a bin.



The base intervention cost for all households in this study was $3.80 per household. The additional cost for households that requested and received an in-home recycling bin with recycling information and sticker was $16.65 per household, for a total cost of $20.45 per household. The city completed the delivery of all in-home recycling bins, internalizing that cost.

While the cost per household was substantially higher for the households that requested an in-home bin, because only 20% of households requested a bin, the programmatic cost of implementing five mailers with the option of an in-home recycling bin was $7.13 per household. In a community implementing this program, the cost would vary based on the number of households that request a bin.

Delivery of In-Home Bins

The study conducted by The Recycling Partnership in Cincinnati in 2021 indicated that when compared with digital advertising, business reply mail generated the highest response rate with 21% of households that received business reply mailers requesting an in-home recycling bin. Based on this prior finding, a business reply mailer was the only method chosen to inform and encourage residents to request an in-home recycling bin.

All bin requests received as part of the 2022 study were noted by address and method of request (mail, online or by phone).

Requested bins were delivered in phases from May through July 2022 with recycling information, recycling collection calendar, and sticker applied to the bin with information on accepted recycling materials.

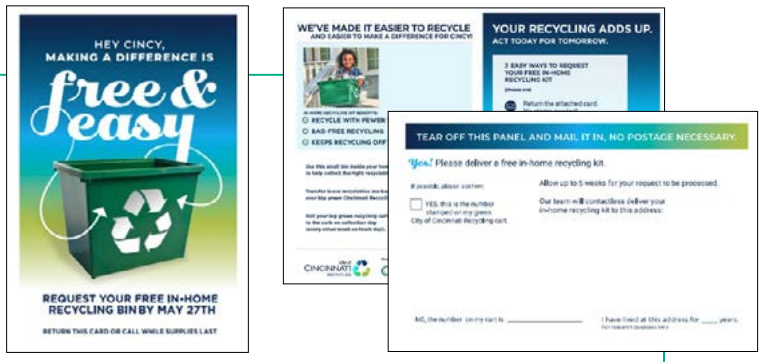
Messaging and Mailings

All intervention group households were sent five mailings. In addition to the mailer promoting free in-home recycling bins, residents were sent four mailers to encourage recycling participation, clarify collection schedules, and remind about accepted and non-accepted materials. The follow-up mailers were mailed about one month apart, with the first mailing one week after all bins were delivered in mid-July and last arriving in December 2022.

Mailer #1

Encouragement and instructions to opt-in for a free in-home recycling bin.

This mailer was the same one used in the 2021 study. In a 2021 focus group, participants noted bins were easy to request, and the free bin was very appealing.



Follow-Up Mailer #2 and #3

Reminder collection calendar with standard infocard of what is and is not accepted.

Follow-Up Mailer #4 and #5

The next two mailings utilized motivational messaging intended to encourage infrequent recyclers to increase participation and remind about accepted and non-accepted materials. To develop this motivational messaging, The Recycling Partnership worked with a team of designers to develop 20 different visual designs from 10 different data backed concepts. We interviewed nine infrequent recyclers for 30-40 minutes each to learn which messages were most motivating.

Empathetic Message (Top)

This design was relatable. We heard, "This cat gets me!" several times.

Logical Message (Bottom)

Everyone wanted to know what happens to their recyclables, so we put together visuals of the process and they tested well.

Methodology & Findings

Household participation in recycling is a helpful metric to understand which households are actively recycling and which households could benefit from increased education or support to increase recycling. Address specific tip data was pulled for the previous annual year (2021) from RFID technology to generate recycling participation profiles for all households within this study. We hypothesize that most residents that are setting out recycling one time per month or less frequently have an opportunity to increase recycling.

The recycling participation profiles include non-recyclers, recyclers, and infrequent recyclers. Recycling is collected every other week with 26 collection cycles each year. The qualifiers for the participation profile types are as follows for the 2021 calendar year:

Recycler
Set out recycling at least once a month or more on average (12 or more set outs over 26 collection cycles)

Infrequent Recycler
Set out recycling less than once a month on average (1 - 11 set outs over 26 collection cycles)

Non-Recycler
Did not set out recycling (0 set outs over 26 collection cycles)

For the 2022 study, tip data was analyzed for 14 collection cycles (based on every other week collection) pre- and post-in-home recycling bin delivery.

In addition to tip data, recycling tonnage was analyzed for the routes within the intervention and a separate designated control group. Recycling tonnage was derived from scale house weights on collection trucks servicing the respective routes.

Historical tonnage from June to November 2021 was analyzed, along with tonnage for 12 collection cycles pre- and post-intervention. The 12 collection cycles pre-intervention were tracked January through June of 2022 and post-data was from June through November of 2022. The designated control group included all households within the city that were not part of the treatment group, for a total of 99,510 households.

Impact on Recycling Participation

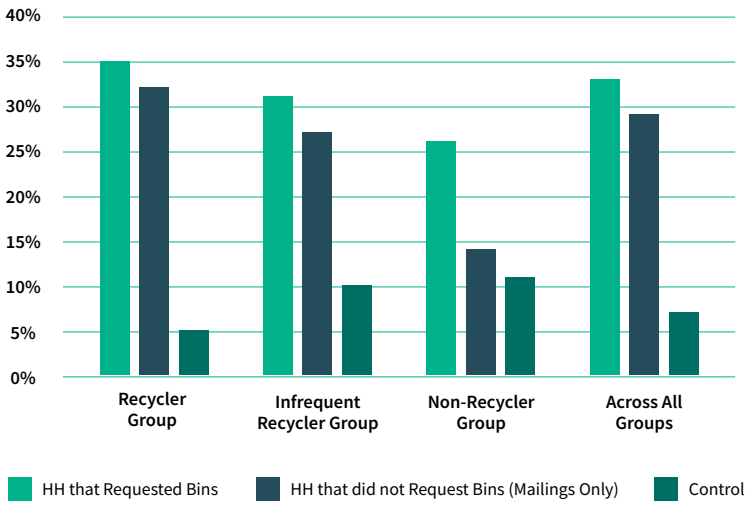
There was a statistically significant increase in the number of set outs for both the group that requested a bin and the group that did not, with the group that did request a bin showing the greatest increase. The average increase in set out was 33% for the entire group that requested a bin and 29% for the group that did not, while the change in the control group was only 7%. To further understand the impact of the interventions, we analyzed the impact by recycling participation group. By looking at each individual group, it provides greater visibility to the impacts of the interventions.

Households in the recycler and infrequent recycler group had substantial increase in their recycling set outs when compared to the control regardless of whether the household requested an in-home bin. However, based on this study, a targeted approach that focuses on the non-recycler group would potentially have the greatest impact at the lowest cost.

Households classified as non-recyclers that requested an in-home bin increased recycling set out by 26% while those that did not request a bin increased set out by 14%, a statistically significant difference. Although this is the lowest increase in set out by group, it still marks an impressive increase, especially because it requires the most significant change in behavior to move from a non-recycler to setting out recycling. Additionally, there is not a statistical difference between the increases in the group that received mailings and the control group. This suggests that messaging only may not be sufficient to change behavior for residents that are not already recycling.

Average Increase in Recycling Set Out

Difference Between the Average Collection Set Out in Baseline and Post Intervention Phase



Key Takeaway

For households already recycling, frequent mailings had a significant impact on recycling set out. Regardless of whether the house requested a bin or not.

For households that were not recycling, the in-home bin with mailers helped convert some non-recyclers into recyclers.

Messaging is likely enough for households already recycling but households not already recycling, likely need additional support to start recycling.

Increases in set out occurred within the control group, but these increases were much less for all participation profiles.

Impact on Recycling Tonnage

To analyze the impact of the interventions on the amount of recycling collected, the average pounds per household was calculated using truck tonnage data. This allowed us to estimate the impact on individual households and helped account for any inconsistencies in collection due to route boundary fluctuations.

While the average pounds per setout remained consistent between the control and treatment groups, because of the increased number of set outs in the treatment group, we recognized a calculated increase in 164 tons of recycling between pre- and post-intervention over a 24-week period. This is a 94% increase in tonnage between pre- and post-intervention, for the treatment area. In comparison, the control area had an 8% increase between pre- and post-intervention.

Impact on Resident Recycling Knowledge and Perspectives

Focus groups were conducted to gain qualitative insights on how in-home recycling bins impact recycling. The focus groups segmented for the 2022 study and the 2021 study where residents universally received an in-home bin.

Among focus groups of residents that requested an in-home recycling bin there were words like "excited" used to describe the reaction to receiving the bin. Residents were pleased with their experience because the arrival of the bin was timely and requesting a bin was simple and free. Communicating that the bin was free stood out as a primary driver for residents requesting a bin. Additionally, several participants noted they rushed to place their request as the "while supplies last" messaging created a sense of urgency.

> *"I went to open up my front door and saw it on my step. I was excited, that's all I remember."*
> —Focus Group Participant
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> *"I got the postcard and ordered it, and I was really excited about getting it, because it had replaced this giant cardboard box that I had. So, it takes up a little bit less room, and I don't have to keep taping it back together."*
> —Focus Group Participant
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> *"I called because it said, 'While supplies last,' so I didn't take the chance of mailing it. I called them."*
> —Focus Group Participant

Residents mentioned convenience and organization as two predominant drivers for using the bin. In some cases, the bin was used to replace haphazard containers or systems, like a taped-up cardboard box, plastic or paper bags, or stacking items on a countertop. The ability for the bin to reduce clutter and its size were two features mentioned as motivators for its use. Some residents reported receiving the bin motivated them to better organize their in-home recycling system.

> *"Has that (in-home bin) improved your recycling habit?"*
> —Moderator
>
> *"Yes, because now you're not running out the door with everything in your hand several times a day, throwing something into recycling. You're actually collecting it at one location and then taking it out once it's full."*
> —Focus Group Participant

Among residents that did not request a bin, there was much lower recall of the postcard offering the in-home recycling bins. When residents in this group were shown the postcard, about half of the participants noted they did not realize this was a smaller size recycling bin and meant for inside the home. Several indicated they interpreted the image of the bin to be like the old recycling bins that were used for curbside collection (rather than a recycling cart). Additionally, several participants did not see the need for an in-home bin because they already had a recycling system in place.

> *"That would not work in my house, because I just don't have room... but I have something similar, where I just have a little tote box sitting on my kitchen counter... I have no space for an inside bin, although I think it's a good idea."*
> —Focus Group Participant

In the focus group with residents that universally received a recycling bin in 2021, they reported they **still had the bin in use to collect recycling in their home over a year later**. These households did not request the in-home recycling bins but shared the other group's excitement for the bins.

> *"I was really excited about it when I got it. Came with a note … the excitement of trying to find out where it came from and telling my neighbor and them wanting one. It was a nice surprise."*
> —Focus Group Participant

Conclusion

In this study, we found that frequent mailings increased recycling participation and set out, and when residents opted in to receive an in-home bin, this increased participation even further. This increase in set outs also equated to increased recycling tonnages.

For any community recycling program, a best management practice would be to gather participation data for your residents. That data can be used to segment your outreach among the recyclers and non-recyclers in order to maximize impact in the most cost-effective manner.

The greatest shift in participation when comparing the group that requested a bin and those that did not was seen in the non-recycler group. This group needs the greatest amount of assistance to begin recycling. Requesting and receiving in-home bins produced the greatest shift within this group. Additionally, moving non-recyclers to recycling participants potentially yields more material at the household level. Targeting opt in in-home recycling bin distribution may be most cost-effective if the deployment is focused on non-recycler households.

Frequent mailings and in-home bins are a promising tactic to increase recycling participation, both among households that already participate in recycling and those that do not. Additionally, in-home recycling bins show the potential of increasing participation over time, as all residents within the focus group that universally received a bin as part of the 2021 study still had it in use to collect recycling in their home over a year later.

There is no one-size-fits-all, clear roadmap to increase participation and capture in recycling but there are tools and resources that The Recycling Partnership believes can help communities, counties, and states along the way. In 2022, The Recycling Partnership conducted a series of pilot projects through its Center for Sustainable Behavior & Impact to test types of messages, methods for education, and interventions in eight areas across the country. The Recycling Partnership is grateful to each of the communities and counties that participated, as well as Pepsi for their support on this project. Additional information about each can be found at **recyclingpartnership.org**.