

The following partners were critical to making the project a success:



Summary

As more of our lives are spent working, personal happiness is increasingly associated with how easy it is for people to commute to and from work. Yet, hassle-free commutes are becoming rarer and harder to come by. More people are relocating to urban areas, increasing demand on public transit systems. Public transit riders are increasingly facing a ride home with extensive delays and overcrowded trains, which is often amplified when a local event increases demand during the evening commute.

Governments tend to tackle overcrowding through investment in infrastructure—more trains and buses, larger trains and buses, and more rail lines and bus routes. In Chicago, the Chicago Transit Authority (CTA) runs trains as frequently as every 2-3 minutes during morning and evening rush periods to accommodate peak demand. These solutions, while impactful, are often costly and difficult to implement. This problem isn't unique to the city of Chicago; other urban centers around the country are seeking lower-cost solutions to improve commutes. New York City plans to remove seats from subway trains while the Metro in the Washington, DC area uses system-wide peak and off-peak prices to reduce demand.

Highlights

- ▶ Existing heavy demand on public transit for everyday commuting is amplified with local events.
- ▶ Commuter behavior is built on habits. Many commuters do not need to travel during peak hours.
- ▶ Fare rebates are an effective incentive to shift commuters behavior, reducing travel demand and easing overcrowding.

Problem Background

In the United States, transit spending as a percentage of GDP has remained at about 2.5% since the 1970s, even though ridership has increased as more individuals and families move to urban environments. In New York City, annual ridership has increased by 800 million trips over 1990 levels. The story is similar in Chicago, with an additional 95 million annual rides above 1990 levels and, in 2015, CTA rail ridership broke all the city's historic records.

Overcrowding in Chicago's elevated and subway trains—known locally as the “L”—is especially apparent on the City's Red Line, a north-south train serving the downtown as well as some of the most densely populated residential neighborhoods along Lake Michigan. Riders leaving downtown and heading to Lincoln Park, Lakeview, and other north side neighborhoods are especially susceptible to overcrowding when the Chicago Cubs play



a weeknight game at Wrigley Field. Red Line trains running from downtown to the Howard stop are consistently operating at peak capacity during the evening rush period. The Red Line is also the main transit option for people attending evening baseball games at Wrigley Field. Wrigley Field is located on the Addison stop, about four miles north of downtown. The influx of fans staying at hotels between downtown and Lakeview increases demand during already busy weeknight commute rush hours.

Intervention Design and Testing

Analyzing the problem, designing solutions and field testing interventions required a diverse set of collaborators. The initiative saw City Digital partner with Mastercard to manage the project, as well as bring all partners to the table to facilitate the design and implementation. Mastercard offered additional funding for potential incentives; CTA provided historical ridership data and analytics during the testing phase, and managed the connection between opted-in customers and their Ventra accounts. Syniverse managed the opt-in process and messaging platform; and ideas42 managed the intervention design and provided data analysis and project management.

At first glance, the problem appears straightforward: L demand peaks for an hour when everyday commuters and baseball fans converge on the Red Line to head north. Data confirms the peak evening hour for ridership is between 5PM and 6PM. This congestion causes additional delays and an unpleasant experience for commuters.

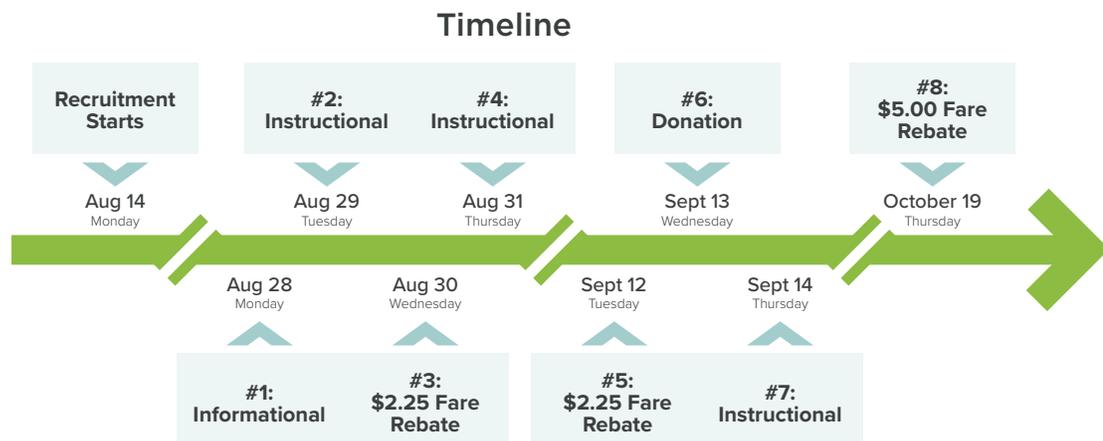
Any potential solution would need to smooth out this peak, or move the demand of riders during the rush hour peak to the adjacent hours. Some individuals may need to travel at peak times for inflexible structural reasons, such as work hour restrictions, evening appointments, or childcare. However, some commuters travel at peak time due to a learned habit resulting from a series of past decisions. These commuters may be more conditioned to travel at peak times and are unlikely to modify their usual rush hour transit cycle. These commuters could leave work or travel before 5PM or after 6PM; there may not be a direct need for this group of riders to travel at the peak hour other than from habit.

Given these realities, the project is specifically designed to target and change the behavior of the segment of commuters who have the ability to modify their travel time. To do this, Mastercard, the CTA and Syniverse jointly designed a messaging platform that reminded commuters at the time of day they are making the habitual decision that reflected their choice set. The intervention used low-cost, efficient, and consumer-friendly text message reminders sent before Cubs home games to encourage and incentivize riders to take the Cubs game into consideration when making evening travel plans, and then change their travel time. Text messages are an ideal method of reaching commuters during the crucial moment of action. As 90% of text messages are [read](#) within three minutes of receipt, text messages are an effective platform to reach passengers, in addition to being low-cost and simple to send.

The program launched on August 14, 2017 with a series of press releases, emails to CTA riders, and in-station posters encouraging riders to opt-in to receive text message alerts via their mobile phones. Once their phone numbers were registered with their Ventra accounts, riders received a Cubs game day text message at 3PM alerting them to the evening's 7:05PM game. Four types of messages were sent on days with Cubs home games from late August through September:

- **Informational:** Announcing an evening Cubs game that day
- **Instructional:** Suggesting riders travel on the Red Line between 4-5PM or 6-7PM instead of 5-6PM

- **Fare Rebate:** Offering a fare rebate for registered riders who travel at an off-peak hour. Mastercard provided funding for the fare rebates.
- **Donation:** Offering a \$5 donation to a healthcare charity supported by Mastercard made in honor of riders traveling at an off peak hour. Mastercard provided funding for the donations.



Intervention Results

Participants who opted-in to receive text messages were alerted to a 7pm Chicago Cubs game played at Wrigley Field on weekdays. In total, 2,002 people opted-in to receive text messages, and 1,172 opted-in customers successfully linked to their Ventra card to receive the rebates. From August 14th (when the campaign started) through October 26th, 20,723 SMS messages were sent, and 69 users opted-out of the campaign.

The study tracked users from the pool of 1,172 rebate-eligible customers who registered their Ventra accounts and phone numbers. It focused on commuting behavior starting in downtown Chicago, and tracked entries into the Red Line system from six downtown Red Line stations (Harrison to Chicago stations). In addition to the participant group, data from other groups were used as comparisons to understand any system-wide patterns that may influence ridership, including a general population of Red Line riders, and general population of CTA riders.

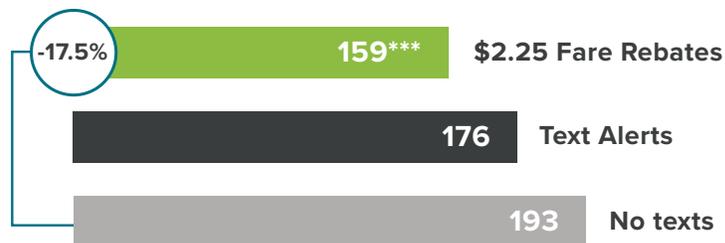
Fifty-five percent of the participants who ride the Red Line from 4-7PM do so between 5-6PM. This is higher than the 46% and 43% of general Red Line and CTA populations, suggesting that participants were more likely to ride during the peak hours and the people who opted-in represent a user profile more likely to benefit from moving away from peak-hour ridership than the typical Red Line user. No rider demographic data was obtained.

The data suggests that the \$2.25 fare rebate is correlated with a 17.5% reduction in peak-hour ridership. On weekdays when no text messages were sent, 193 riders would typically use one of the six downtown Red Line stations between 5-6PM. On days with fare rebates, only 159 would use the six Red Line stations—a 17.5% decrease in participant ridership ($p < 0.01$). Text messages providing information about a Cubs game, instructing riders to avoid the 5-6PM rush, and offering a \$5 donation to Stand Up to Cancer reduced peak hour ridership

by 9.7%, but that effect was not statistically significant. Participants do not appear to have taken a different mode home, either. Ridership from 4-7PM seems to have increased from about 340 riders to 373 on fare rebate days—a 9.2% increase.

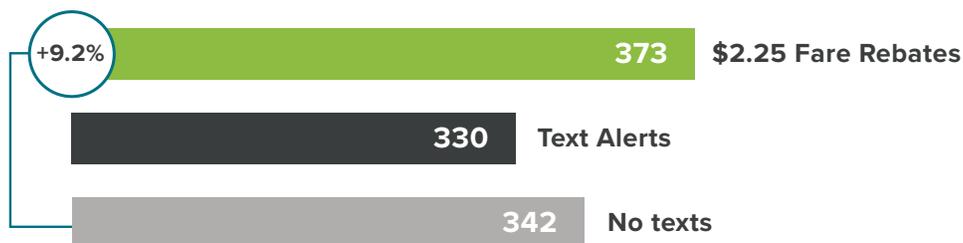
Other factors included in the analysis but that do not appear to impact ridership include: comparable rider groups, days of the week, weather, attendance at Wrigley Field, promotional events, opposing MLB team records and rivalries, university and public school calendars, train delays, concerts or other large events. None of these factors are correlated with the reduction in peak-hour ridership.

FARE REBATES CORRELATED WITH DECREASED PARTICIPANT RIDERSHIP FROM 5-6 PM



***17.5% Decrease is statistically significant (p<0.01).

FARE REBATES CORRELATED WITH INCREASED PARTICIPANT RIDERSHIP FROM 4-7 PM



Lessons Learned and Next Steps

The results of this pilot study show the potential for low-cost solutions to improve the commute home. Instead of large infrastructure investments to alleviate overcrowding at peak hours only, the results of this pilot study suggest that low-cost fare rebates may help alleviate some of the burden mass transit riders face daily. While the results of this pilot study are encouraging, more study is needed to ascertain if this pilot is scalable to have a substantive impact at scale, with thousands more riders participating in the text message alerts. Informational and instructional text messages showed some reduction in peak-hour ridership, but not enough data was collected to determine if that is a trend. Additionally, is a rebate of \$2.25 the optimal incentive to change commuter behavior? What other incentives could be offered to change behavior? Would a loyalty program be effective in changing behavior as well? We are looking forward to exploring some of these questions in the next phase of this project in 2018.