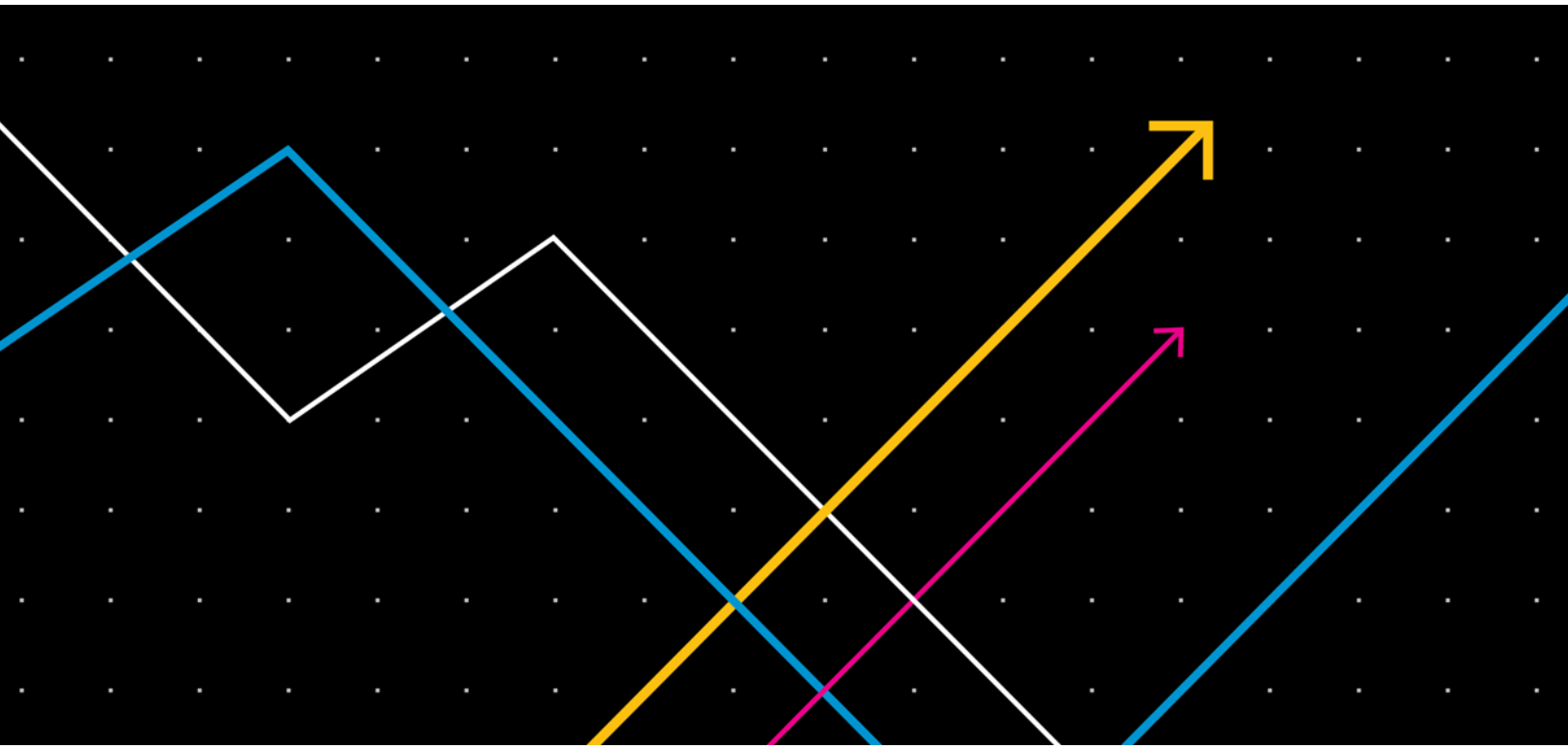

RESEARCH REPORT

Denver Housing to Health (H2H) Pay for Success Project

Evaluation Design

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Contents

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Denver Housing to Health (H2H) Pay for Success Project

Background and Context

The Denver Housing to Health (H2H) Pay for Success project will provide supportive housing for individuals at the intersection of multiple public systems—those who are experiencing homelessness; have a record of at least eight arrests, at least three of which are marked as transient, over three years in Denver County; have a recent Denver Police Department (DPD) contact; and are at high risk for avoidable and high-cost health services paid through Medicaid, including services received at Denver Health and Hospital Authority (Denver Health).

The project is an extension of the Denver Supportive Housing Social Impact Bond Initiative (Denver SIB), a supportive housing program designed to serve a population experiencing homelessness that frequently cycles in and out of jail. In addition to improving housing stability and reducing jail stays, the evaluation of the Denver SIB found that the intervention had an impact on health service use by increasing preventive office-based care and lowering the use of high-cost services, such as emergency department visits and inpatient hospital admissions. These shifts in health service use could result in a net decrease in claims billed to Medicaid and Medicare, which are largely paid by the federal government.

Existing Evidence Base

Supportive housing comes out of the movement to end homelessness among adults with serious mental illness and drug addiction. Previous research conclusively shows that the model works to end homelessness for this population (Tsemberis, Gulcur, and Nakae 2004). The literature suggests that supportive housing will also have an impact on health service use, and that a decrease in high-cost services such as avoidable emergency department visits and inpatient hospital admissions will likely be a significant source of cost savings for multiple systems.

Findings from the Denver SIB. The Denver SIB evaluation made a large contribution to the evidence base on the effectiveness of supportive housing in reducing criminal justice involvement and health care use among a homeless population with complex needs. Through a rigorous randomized

controlled trial (RCT), the evaluation of the Denver SIB showed that supportive housing program participants spent more time than the control group in stable housing and that the program significantly reduced shelter use, police interactions, and jail stays. Denver SIB supportive housing program participants also used short-term or city-funded detoxification services less often than those in the control group. In the three years after randomization, people referred for supportive housing had four fewer visits to a short-term or city-funded detoxification facility (a 65 percent reduction) than those who received usual services in the community. The differences between the two groups' uses of emergency medical services were not statistically significant (Cunningham et al. 2021). Supportive housing helped SIB participants make fewer emergency department visits, use more office-based health care, and receive more prescription medications (Hanson and Gillespie 2021).

Emergency department visits. Several studies have found that use of emergency departments, for both avoidable and unavoidable visits, decreased with the provision of supportive housing (Martinez and Burt 2006; Mondello et al. 2007; Sadowski et al. 2009; Seligson et al. 2013). Using a pre-post research design, Martinez and Burt (2006) found a 16 percent reduction in the number of residents with an emergency department visit and a 56 percent reduction in the total number of emergency department visits after the first year of supportive housing. Sadowski and colleagues (2009) found a 24 percent difference between the treatment and control groups in the number of emergency department visits in an RCT. However, other researchers found no reductions in emergency department visits for individuals in supportive housing in their pre-post and retrospective cohort studies (Aidala et al. 2014; Kessel et al. 2006).

Substance abuse and mental health. Evidence on the impact of supportive housing on substance abuse and mental health services is promising. Aidala and colleagues (2014) found that supportive housing participants spent half as many days hospitalized for psychiatric reasons compared with a comparison group. Similarly, matched comparison and pre-post studies all found reductions in psychiatric hospitalizations for individuals who moved into supportive housing (Culhane, Metraux, and Hadley 2002; King County 2013; Mondello et al. 2007; Seligson et al. 2013). Some of these studies included a mental health diagnosis as a criterion for eligibility. The literature on alcohol and drug treatment is more mixed, though very limited. Aidala and colleagues (2014) found no effect on detoxification facility days, nor did Larimer and colleagues (2009) in their quasi-experimental study. However, Aidala and colleagues (2014) found a large decrease in residential alcohol and drug treatment days, with the intervention group avoiding residential treatment completely.

Cost of care. Several studies found significant reductions in the cost of care for participants in supportive housing (Aidala et al. 2014; Culhane, Metraux, and Hadley 2002; Flaming et al. 2013;

Larimer et al. 2009; Martinez and Burt 2006). Culhane, Metraux, and Hadley (2002) found an average of 32 percent reduction of inpatient Medicaid claims along with an increase in outpatient Medicaid claims. Cost savings were driven by decreased use of the most expensive health care services, in particular hospital visits and inpatient psychiatric services. The National Academies of Sciences' Committee on an Evaluation of Permanent Supportive Housing Programs for Homeless Individuals found evidence that supportive housing could decrease emergency department use and hospital stays when provided to individuals who were high users of these services before being housed (National Academies 2018).

Taken together, the existing literature suggests that stable housing may make health concerns known and increase the use of certain types of health care services, perhaps at an earlier or less severe stage than would be the case absent housing. It also suggests that supportive housing may help manage health concerns in a way that limits the types of health crises that lead to services such as psychiatric hospitalizations and in-patient alcohol and drug treatment. This shift from crisis care to effective care management suggests decreased severity or burden of illness and increased well-being, as well as more effective use of health care services and resources.

Target Population and Program Structure

The target population for the H2H project includes individuals who are experiencing homelessness and have a record of at least eight arrests, at least three of which are marked as transient, over three years in Denver County; had a police contact in the last year; and are at high risk for avoidable and high-cost health services paid through Medicaid, including services received at Denver Health. There are over 1,300 individuals who meet the criminal justice criteria. We apply a medical criterion of two or more emergency department visits in the year prior with Denver Health, resulting in an eligible population of over 250 individuals. An additional 50 individuals meet this criterion every six months.

The previous Denver SIB project provides a good approximation for what the population for this study will look like. Of the 724 individuals in the original SIB, most were men (85 percent) and the median age was 44 years. Forty-seven percent of the people in the study were white, 34 percent were Black, 13 percent were Latinx, and 6 percent were Native American. Individuals in the study had high rates of arrest, with an average of four arrests per person in the year before randomization. They also had high rates of engagement with the homelessness services system in Denver. In the year before randomization, nearly 70 percent of the study group had at least one shelter stay, and the combined group's average number of days in a shelter was 158. In addition to experiencing chronic, or long-term, homelessness, these individuals had an average of 2.5 separate stays in jail and spent an average of 68

total days in jail in the year prior to enrollment in the SIB evaluation (Cunningham et al. 2021). Among those who had any Medicaid use as members of Colorado Access or Denver Health (Medicaid insurers in the Denver metro area), almost 67 percent had been diagnosed with a substance use disorder, and over half of these diagnoses were for alcohol use disorder. Thirty-seven percent of this group of Colorado Access or Denver Health members had a mental health diagnosis, the most common of which were schizophrenia, anxiety, and depression (in order of prevalence) (Hanson and Gillespie 2021).

The H2H project plans to provide supportive housing to 125 of these high-need individuals through the Colorado Coalition for the Homeless (CCH) and WellPower (formerly the Mental Health Center of Denver). Supportive housing is an evidence-based model that uses a Housing First approach to lower barriers to housing and end homelessness through permanent, affordable housing subsidies and intensive case management and wraparound services. (In prior evaluation reports on the related Denver SIB Initiative, Cunningham and colleagues [2018b] describe the intervention's housing and services model in detail.) However, deeply subsidized or even affordable housing is extremely scarce in Denver and is not available to meet the full extent of the need demonstrated by the current eligibility list. Because of this scarcity, the project is suitable for an RCT evaluation. Random assignment will be used as a fair method to allocate scarce supportive housing resources and to evaluate the impact of the intervention on the treatment group as compared with a control group receiving usual services available in the community in the absence of a targeted supportive housing intervention. Because random assignment helps ensure the treatment and control groups are as similar as possible for as many observation characteristics as possible, by comparing outcomes between the two groups we can attribute any differences directly to the supportive housing program and not to participant characteristics or other general conditions or changes in the community.

Overview of Evaluation

Theory of Change

As a result of experiencing homelessness and barriers to care for substance use and mental health problems, many individuals who experience homelessness are frequently cited for offenses such as public intoxication, panhandling, and trespassing. Individuals in this population are frequently arrested and cycle in and out of jail, detoxification centers, and avoidable emergency department and hospital visits, effectively increasing costs across systems. Because they often do not receive follow-up services when they are released from jail, detox centers, or hospitals, these individuals return to the same risks

and experience a recurring cycle of negative outcomes. This cycle results in continuously high costs across agencies and service providers. Supportive housing is a scarce but proven intervention to interrupt the status quo (Tsemberis, Gulcur, and Nakae 2004). As depicted in table 1, supportive housing results in intermediate and long-term outcomes that demonstrate a shift from the usual homelessness–jail cycle to a more cost-effective, cross-sector solution for improving outcomes at the intersection of criminal justice and health.

TABLE 1
Theory of Change

Intervention	Intermediate outcomes	Long-term outcomes
Housing subsidy ▪ provide rent assistance in a housing unit that is safe, sustainable, functional, and conducive to tenant stability Case management services ▪ develop a case plan ▪ facilitate access to benefits ▪ provide referrals ▪ coordinate care	Increase housing stability ▪ reduce homelessness ▪ provide a safe, healthy, and stable housing unit Decrease police contacts ▪ decrease alcohol and drug use, trespassing, and panhandling Increase access to health services ▪ connect to mental and physical health care and substance abuse treatment ▪ increase preventive, office-based care	Decrease criminal justice involvement ▪ decrease arrests ▪ decrease jail days Decrease emergency health services ▪ decrease detox visits ▪ decrease avoidable emergency department and hospital visits Improve health ▪ decrease severity of illness ▪ improve mental health ▪ improve physical health

Source: Framework developed by Urban.

Research Questions

Our evaluation is designed to understand how supportive housing interrupts the target population's cycle of homelessness, jail, and emergency health services and to estimate the impact on health care use and associated costs, including patterns of primary care, avoidable emergency and hospital care, and substance use treatment. The evaluation will determine the amount of any net reductions in federal expenditures for associated Medicaid claims as defined below in "Net Reduction in Federal Expenditures for Medicaid Claims." The primary research questions to be answered by the evaluation include the following:

- Do housed participants retain housing?
- Does supportive housing decrease days in jail?

- Does supportive housing impact the target population's pattern of primary care, emergency and hospital care, and mental health and substance abuse treatment?
- Does supportive housing decrease avoidable emergency department and hospital services for the target population?
- Does supportive housing decrease net federal expenditures for Medicaid claims?

Major Components of the Evaluation

OUTCOMES AND IMPACT STUDY

To determine outcomes and the associated outcome payments, we will track participant exits from housing and measure days spent in housing and jail to determine associated payments from the City and County of Denver; estimate the impact that supportive housing has on the target population's jail days to determine associated payments from the City and County of Denver; and estimate the impact that supportive housing has on the target population's health service use as shown in the data from Medicaid and Medicare claims to determine the associated payments from Social Impact Partnerships to Pay for Results Act (SIPPRA) funding.

As described in the next section, we will use an RCT as the foundation of the evaluation. Eligible individuals will be randomly assigned to one of two groups—one that receives supportive housing as part of the project and one that receives usual care services. We will measure differences in outcomes between the groups (i.e., their use of services) using administrative data. We will use data from CCH and WellPower to measure days in housing. We will use data from the Denver Sheriff Department to measure the impact on jail days. We will use data from the Colorado Department of Health Care Policy and Financing or other sources of Medicaid or Medicare as needed and available to measure the impact on health service use and Medicaid and Medicare claims.

OUTCOME VALUATION

To determine the amount of any net reductions in federal expenditures for associated claims, we will compare the amounts billed for these claims for the treatment and control groups using claim-level data from the Colorado Department of Health Care Policy and Financing. Below, and in the outcome valuation attachment of the H2H SIPPRA application, we describe the steps we will follow using a difference-in-differences (DID) analysis. We also outline the key assumptions we will use in our analysis to determine the change in the federal share of amounts billed for Medicaid and Medicare claims and

the associated outcome payments from SIPPRA funding based on the net reduction in federal expenditures.

IMPLEMENTATION STUDY

Key process-related information, including information from the housing and referral pipeline, is necessary to manage implementation and to make midcourse corrections to keep the initiative on track to achieve long-term outcomes. Process information will also help us interpret the results of the impact evaluation based on documentation of the program model and participant engagement. To collect information about these different domains, we will manage an engagement dashboard as well as a housing enrollment pipeline. We will conduct annual site visits and key informant interviews with service providers and other important stakeholders. We will also review program-related documents, such as training manuals, standard operating procedures, and other descriptions of program components. Table 2 lists the primary evaluation components of the study.

TABLE 2

Primary Evaluation Components

Evaluation component	Research questions	Data sources
Outcomes and impact study	▪ Do housed participants retain housing? ▪ Does supportive housing decrease days in jail? ▪ Does supportive housing impact the target population's pattern of primary care, emergency and hospital care, and mental health and substance abuse treatment? ▪ Does supportive housing decrease avoidable emergency department and hospital services for the target population?	▪ program housing retention data from the Colorado Coalition for the Homeless and WellPower ▪ administrative data from Colorado Department of Health Care Policy and Financing
Outcome valuation	▪ Does supportive housing decrease net federal expenditures for Medicaid and Medicare claims?	▪ administrative data from Colorado Access, Denver Health, and Colorado Department of Health Care Policy and Financing
Implementation study	▪ How is the program implemented? ▪ How are eligible individuals located and engaged? ▪ How do participants take up housing and services? ▪ Is there fidelity to the service model? ▪ How does this intervention differ from usual care? ▪ What types of systems change were achieved?	▪ engagement dashboard ▪ key informant interviews ▪ program documents from service providers

Source: Framework developed by Urban.

RCT Design

Randomized controlled trials are widely considered to be the gold standard in measuring the effectiveness of a policy or intervention. RCTs are useful for establishing the counterfactual, or what would have occurred in the absence of the intervention. In the case of this initiative, the RCT design will compare the trajectories of individuals who receive priority placement in supportive housing and those who receive usual care. The target population for the Denver H2H includes more individuals who are eligible for the intervention than can be accommodated by the limited available supportive housing. The initiative will therefore allocate the limited supportive housing by lottery, which is a fair way to allocate the scarce housing resources.

The study will randomly assign eligible individuals to the treatment group, whose members will be referred to one of the two supportive housing providers for the H2H program, or to the control group, whose members will continue receiving services as usual in the community. The H2H program will fund 125 units of supportive housing over seven years. Participants will enroll in the study on a rolling basis until all units are filled. Based on our experience with the previous SIB evaluation, we expect approximately 16 percent of the supportive housing units to turn over every year and require a new study participant, resulting in a total of 245 individuals served over the seven-year enrollment period. We also estimate, based on the SIB evaluation, that approximately 75 percent of people randomized into the treatment group will ultimately enter supportive housing. Therefore, we expect to randomize approximately 327 individuals to the treatment group to fill the provided units of supportive housing. We also expect to randomize 327 individuals to the control group to receive usual care. This sample will allow us to estimate a small-to-medium effect size as described below under "Minimum Detectable Effects Sizes."

Referral and Randomization Strategy

Using the eligibility criteria, DPD will identify eligible individuals through a data pull and create a deduplicated, deidentified eligibility list for the H2H project, assigning a unique research ID to each individual on the eligibility list. Individuals are identified from the eligibility list as they enter a designated intake point. The H2H project will use primary and secondary intake points to randomly assign individuals to the treatment and control groups. The flowchart in figure 1 outlines the referral and randomization strategy described in this section.

PRIMARY INTAKE POINTS FROM DENVER HEALTH

Denver Health is the primary hospital serving the target population. Denver Health will match the H2H eligibility list (including periodic updates) with its data systems and will send data on the matched individuals who had two or more emergency department visits with Denver Health to the Urban Institute (Urban). After randomization, a treatment individual's name, gender, race, and date of birth will be sent to the supportive housing provider, either CCH or WellPower, by the H2H referral coordinator. The treatment individual's personal identification number (PIN) will be returned to Denver Health. Denver Health may attempt to help CCH find treatment individuals either through passive or direct referrals.

SECONDARY INTAKE POINTS FROM DENVER POLICE DEPARTMENT

DPD intake points will be used to supplement the Denver Health intake points. This practice will allow for data sharing without revealing protected health information, specifically the subjects' use of the emergency department in the past year. It will also serve to supplement the sample size if the Denver Health criteria do not provide sufficient eligible individuals to support the project's enrollment timeline. DPD intake points will consist of having a contact with DPD in the past year but will not include the emergency department criterion. Contacts include police contacts and both custodial and noncustodial arrest. DPD will electronically maintain the SIB eligibility list (including periodic updates) and match the eligibility list with daily arrest and contact lists to identify eligible individuals. Individuals with open felonies within the two years before randomization will be screened out because they are awaiting sentencing, which may negatively affect their ability to enter supportive housing. DPD will send Urban a daily, automatically generated report that lists deidentified PINs for all noncustodial arrests, custodial arrests, and police contacts flagged as transient for individuals on the SIB master eligibility list.

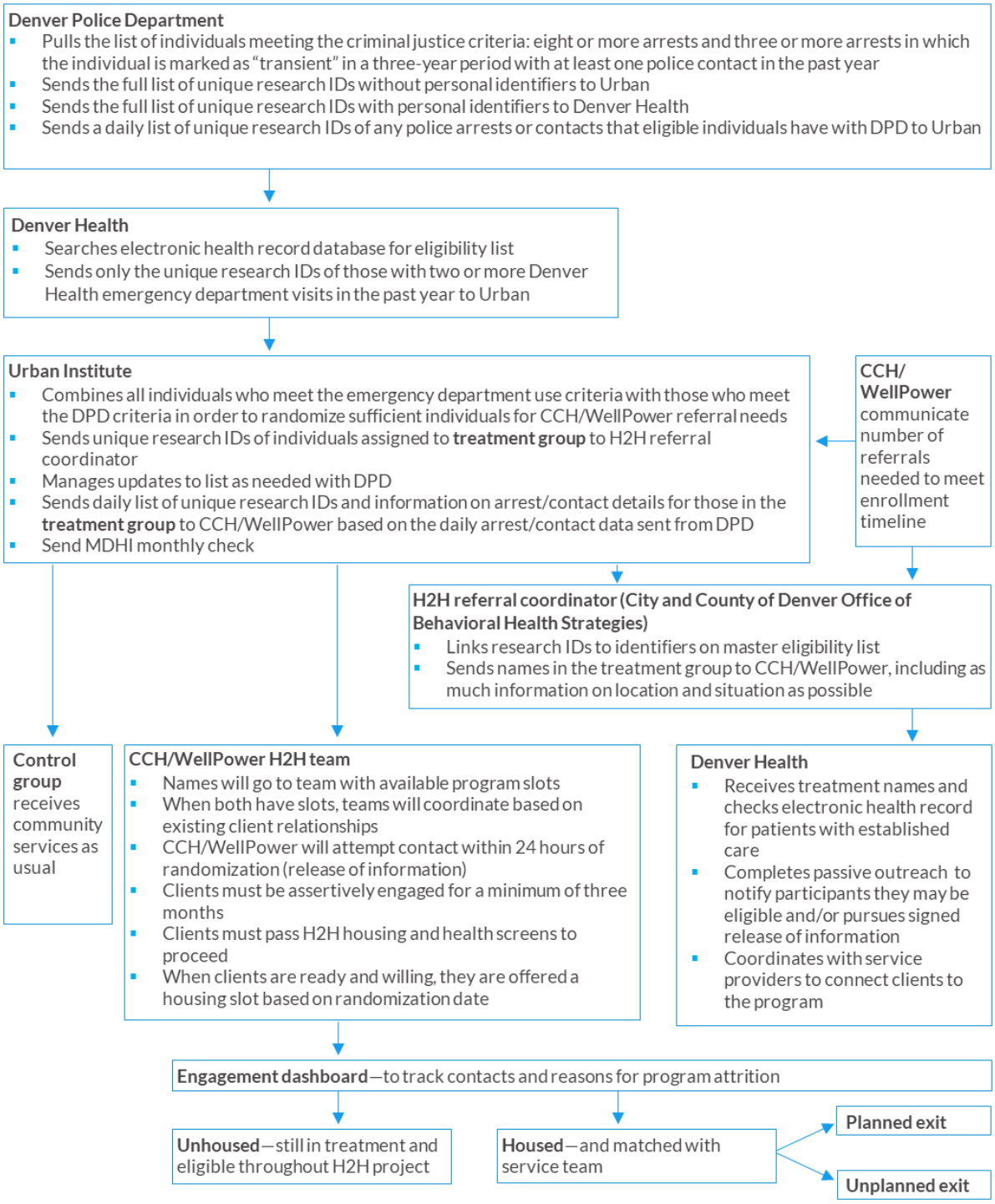
RANDOMIZATION PROCESS

On days when H2H partner providers have open slots to randomize new individuals into the evaluation based on the enrollment timeline, Urban will use the list of eligible individuals identified from the Denver Health intake points and, if additional referrals are necessary, from the automatically generated reports from the DPD intake points. PINs that have already been randomized will be removed, and if there are more eligible individuals than randomization slots, they will be randomly selected for randomization. The number of randomization slots in a given day will be based on the number of new individuals H2H partners have the capacity to serve based on the lease-up schedule. Half of those new PINs will be randomized to the treatment group and half to the control group, stratified by the type of intake (Denver Health intake or criminal justice intake). Individuals not selected for randomization into

either group will return to the master eligibility pool. Urban will send the list of new treatment PINs to the referral coordinator. The referral coordinator will reattach names and other identifying information to the treatment PINs and send this information to the service providers for outreach.

FIGURE 1

Referral and Randomization Flowchart



Source: Framework developed by Urban.

Note: Urban = Urban Institute; Denver Health = Denver Health and Hospital Authority; DPD = Denver Police Department; CCH = Colorado Coalition for the Homeless; H2H = Housing to Health.

If both CCH and WellPower have supportive housing slots available, the two service providers will work together to assign individuals based on any existing client relationships. Outreach workers will attempt to locate each referred individual within one business day of referral to minimize location challenges. When outreach workers locate individuals in the treatment group, they will first have them sign a release of information form. Outreach workers then can immediately begin program engagement, working with other service providers and co-responders to engage each individual. Service providers will engage participants in the treatment group for a minimum of three months before stepping down engagement and requesting a new referral.

After they are located, individuals must also pass the H2H housing and health screens (see housing screen in appendix C; the health screen will be developed by service providers before implementation begins) to confirm homelessness and the ability to live independently before continuing toward housing placement. Urban, working with DPD, will update the list to ensure that individuals are randomized only once; manage any updates as the list is refreshed or expanded; and coordinate with service providers to turn randomization on and off as necessary.

Minimum Treatment Randomization Timeline

The minimum treatment randomization timeline shown in table 3 ensures that a sufficient number of individuals will be randomized to the treatment group to meet available housing slots and the H2H enrollment timeline, based on an average take-up rate of 75 percent, as demonstrated by the related SIB initiative. Urban will ensure that individuals are randomized at least two months before housing slots become available to allow for engagement before lease-up, based on average time from referral to lease-up as demonstrated by the related SIB initiative. Should the H2H enrollment timeline be amended at any time, Urban will amend the randomization timeline.

TABLE 3

Minimum Treatment Randomization Timeline

Month	Total monthly projected placements	Cumulative projected placements	Minimum monthly treatment assignments	Minimum cumulative treatment assignments
November 2022	68	68	9	101
December 2022	8	76	9	110
January 2023	12	88	9	119
February 2023	12	100	9	128
March 2023	12	112	9	137
April 2023	4	116	9	146
May 2023	4	120	9	155
June 2023	5	125	9	164
July 2023	0	125	9	173
August 2023	0	125	9	182
September 2023	0	125	2	184

Source: Urban analysis and project documents.

Data Sharing

Urban will collect only deidentified administrative data that it will link through a project-specific ID that one central agency will share with other administrative data agencies. To make this work, the City and County of Denver's Office of Behavioral Health Strategies will assign a staff person to be the H2H referral coordinator and have access to the master eligibility list. That list will include personal identifiers as well as a project-specific unique ID number for each individual in the treatment or control group. Urban will have only the deidentified eligibility list.

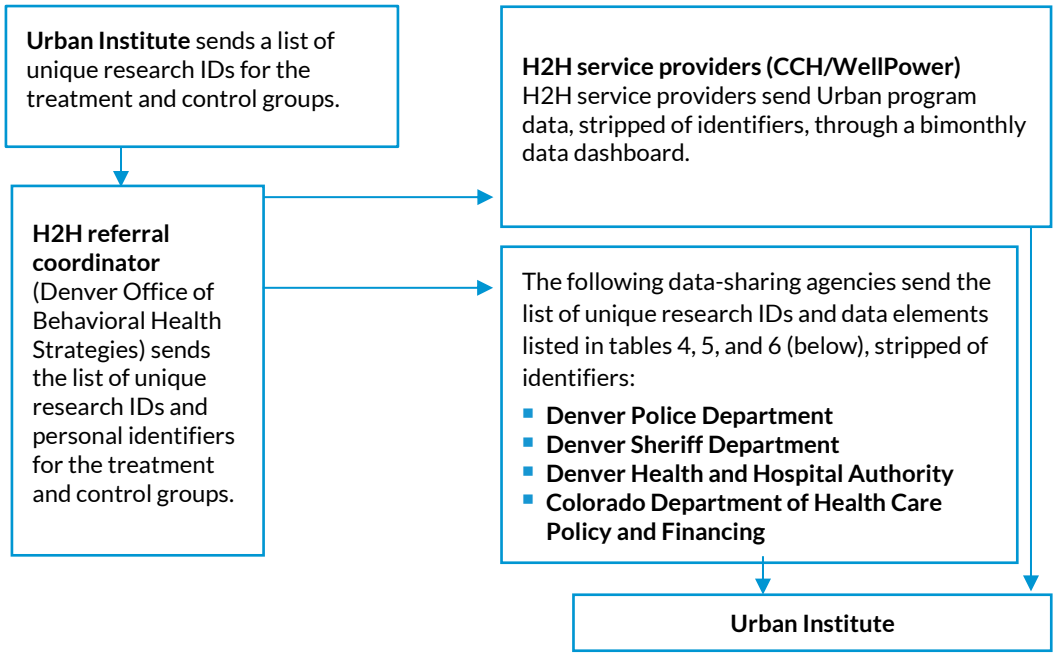
The H2H referral coordinator will share the personal identifiers and the project-specific IDs of the individuals in the study with each of the other agencies identified for data sharing (figure 2). Urban will collect administrative data based on data-sharing agreements with each of those agencies (e.g., H2H service providers, DPD). The other agencies will pull the requested data for each individual in the study using the personal identifiers, attach the unique research identifier to their dataset, and strip the personal identifiers from the dataset. Each of the agencies will send their data, including the project-specific ID, directly to Urban. This method will allow Urban to generate a single deidentified dataset with data from each agency.

Under this plan, Urban will never have access to any personal identifiers for any of the participants in the study. This method of data collection and data sharing ensures that no single agency or entity has

access to more than one dataset with identifiers. Furthermore, Urban will be in control of the linking process and will ensure its quality.

FIGURE 2

Data Access Plan



Source: Framework developed by Urban.
Note: H2H = Housing to Health; CCH = Colorado Coalition for the Homeless.

Data Collection and Analytic Methods for the Outcome Valuation and Outcomes and Impact Study

The evaluation metrics will include information on housing stability and reductions in jail days, to be paid by the City and County of Denver if successful, and net reductions in federal expenditures for Medicaid and Medicare claims, to be paid by SIPPRA funding if successful. Housing stability among the housed treatment group will be used as an interim outcome metric paid by the City and County of Denver because housing retention is a strong predictor of longer-term outcomes of interest. Reduction in jail days, paid by the City and County of Denver, as well as net reduction in federal expenditures for Medicaid and Medicare claims, paid by SIPPRA funding, will be used as the final outcome payment metrics, measured by the differences between the treatment and control groups at the end of the project period.

Net Reduction in Federal Expenditures for Medicaid Claims

The SIPPRA outcome payment will be based on the program's impact on reducing federal expenditures for Medicaid claims. The net reduction in federal expenditures will be measured as the average difference in the change over time (pre- and postrandomization) in the amount billed for claims between the treatment and control groups. This approach to measuring net reductions accounts for potential increases in certain types of claims due to the intervention, such as office-based visits, as well as reductions in certain types of claims, such as emergency department visits and hospitalizations. This outcome will be measured over the full seven-year project period and estimated using the DID approach described in the analysis plan below. All individuals who have been randomly assigned to the treatment or control group for at least one year before the last day of the observation period (December 31, 2027) will be included in the DID estimate for the payment analyses. The evaluation will also report on this outcome midproject to provide a preliminary look at project performance, but no payment will be associated with the outcome at that point. The payment for net reduction in federal expenditures will be made once, based on the final outcome report at the end of the project period.

The proposed data source in table 4 will capture Medicaid information on all individuals in the target population. The Colorado Department of Health Care Policy and Financing oversees and operates Health First Colorado (the state's Medicaid program) and other public health care programs for qualifying Coloradans. If necessary and available, we may pull Colorado Access or Denver Health data. We will request Medicaid enrollment, service use, claims and managed care data, and expenditure data for all individuals enrolled in the H2H treatment and control groups.

TABLE 4

Data Source and Measures for Calculating Net Reduction in Federal Expenditures for Claims

Data source	Measure
Colorado Department of Health Care Policy and Financing	unique research ID beneficiary and provider enrollment service use claims and managed care data expenditure data

Source: Framework developed by Urban.

In calculating the outcome valuation attachment for the H2H SIPPRA application, we made several assumptions, including eligibility of the target population under Medicaid expansion; the federal share of Medicaid expenditures for the target population; the value of claims missing from the data available at the time of this evaluation design; and the impact of reductions in use on federal expenditures through reduced fee-for-service claims, reduced negotiated capitated rates for managed care claims,

and reduced supplementary payments for uncompensated costs. We also assumed a gross domestic product cost deflator from the White House's "Economic Assumptions and Overview" (OMB 2020). The data we use to calculate the actual outcome valuation will resolve some of these assumptions; for example, we will have the full universe of fee-for-service and managed care claims for the study population.

To understand the calculation of how treatment impacts net changes in federal (Medicaid and Medicare) expenditures for health services, we will use a DID approach. The DID estimate, β^{DID}, can be represented by the following equation:

$$\beta^{DID} = (Y^{T}_{t=1} - Y^{T}_{t=0}) - (Y^{C}_{t=1} - Y^{C}_{t=0})$$

where

$Y^{T}_{t=1}$ is the mean outcome for the treatment group (those referred to H2H supportive housing) in the postrandomization period;

$Y^{T}_{t=0}$ is the mean outcome for the treatment group in the prerandomization period;

$Y^{C}_{t=1}$ is the mean outcome for the control group in the postrandomization period; and

$Y^{C}_{t=0}$ is the mean outcome for the control group in the prerandomization period.

Eligible individuals randomized to the treatment population will be counted in the treatment population, regardless of whether they engaged with the service provider, pass the H2H screens, or obtain housing. All eligible individuals randomized to the control population will be counted in the control population, even if they enroll with the service provider or obtain housing.

The DID estimate will be measured by using the regression equation below:

$$Y_{it} = \alpha + \beta^{T} T_i + \beta^{P} Post_t + \beta^{DID}(T_i * Post_t) + \beta^{x} X_{it} + \varepsilon_{it}$$

where

Y_{it} is the amount of medical expenditures for each individual *i* during time period *t* (*t* = 0 is the prerandomization period, and *t* = 1 is the postrandomization period);

T_i and $Post_t$ form an interaction term where T_i is an indicator equal to 1 for individuals assigned to the treatment group and 0 for individuals assigned to the control group, and $Post_t$ is an indicator equal to 1 for the postrandomization period and 0 for the prerandomization period;

X_{it} is a vector of treatment-specific time-varying controls, to be specified later;

β^T is the treatment group–specific effect (measuring the permanent differences between treatment and control);

β^P is the time trend common to control and treatment groups;

β^x is effect of treatment-specific time-varying controls, to be specified later; and

ε is the regression error term.

Urban will obtain approval from the US Department of the Treasury prior to adding any proposed time-varying controls, X_{it}, to the analysis. Thus, β gives the average treatment effect of the intervention on Medicaid and Medicare expenditures of an individual. The savings will be calculated as the coefficient, β, multiplied by the number of individuals randomized into the treatment group.

Housing Stability

The City and County of Denver will make annual outcome payments based on the number of days in stable housing achieved by program participants. Housing stability will be tracked through program and administrative data and will be measured only for the individuals in the treatment group who enter program housing. The threshold, payment points, and other information on how housing stability will be measured—such as reductions to payment points and how exits will be treated—are outlined in table 5.

TABLE 5

Measurement of Housing Stability and Payment Points

Threshold	Payment points	Reductions
▪ The client must maintain a lease for one year from lease-up date before eligible for payments, as defined in the contract. ▪ The client has a lease, sublease, or occupancy agreement in his or her name, as defined in the contract. ▪ A client moves into assisted living with occupancy agreement after being housed in an H2H unit, and service provider continues to provide H2H services to participant; or a client is randomized into the project, moves directly into assisted living with occupancy agreement, and service provider continues to provide H2H services.	▪ After threshold is met, the City and County of Denver makes payments annually starting on May 31, 2024, based on days in housing before and after threshold, according to payment schedule, as defined in the contract.	▪ Days spent in jail since lease-up date will be subtracted from days eligible for payments, as defined in the contract.

Exits	
Planned: If a client meets any of the conditions below prior to or after achieving the one-year threshold, success payments will be made for the total number of days that the client was stably housed before exit at the per diem rate: ▪ death ▪ exit to other permanent stable housing where the client is named on a lease, sublease, or occupancy agreement OR has a letter stating that he or she is allowed to reside with the leaseholder or owner in the unit on a permanent basis ▪ entrance to long-term residential treatment (other than assisted living) that exceeds 120 days in order to address a physical or behavioral health issue ▪ incarceration for actions solely occurring before H2H randomization	*Unplanned:* If a client meets any of the conditions below before achieving the one-year threshold, success payments will not be made for that client: ▪ loss of voucher/lease for any reason other than those specified under planned exit reasons (voucher loss may occur after 120 days away from unit; e.g., incarceration, return to homelessness, or after eviction) ▪ termination of assisted living occupancy agreement after 120 days away from the facility for any reason other than those specified under planned exit reasons

Source: Framework developed by Urban.

The data sources and measures that will be used to calculate housing stability are outlined in table 6. Program data from WellPower and CCH will be collected approximately bimonthly through the engagement dashboard, as specified in the data-sharing agreements with each service provider. Data from the Denver Sheriff Department will be collected at least every six months as specified in the data-sharing timeline within Urban's contract with the City and County of Denver. Data will be linked by unique research IDs to calculate housing stability outcomes.

TABLE 6

Data Sources and Measures for Calculating Housing Stability

Data source	Measures
CCH and WellPower program data	unique research ID lease-up date housing exit date housing exit reason
Denver Sheriff Department	unique research ID jail entry date jail exit date facility

Source: Framework developed by Urban.
Note: CCH = Colorado Coalition for the Homeless.

Jail Day Reduction

In addition to making outcome payments based on the number of days in stable housing, the City and County of Denver will make two outcome payments based on the program's impact on reducing jail days. Jail day reductions will be measured as the average difference of jail days between the treatment and control groups two and four years from randomization date and will be estimated using the treatment-on-the-treated (TOT) approach described in the analysis plan below. The payment for jail day outcomes will be made twice, at the middle and end of the evaluation period. The first payment will be based on two-year jail day outcomes, and the second payment will be based on four-year jail day outcomes.

JAIL DAY REDUCTION ESTIMATION METHODS

To understand the calculation of treatment impacts using the TOT approach, we first explain how treatment impacts are calculated using the intent-to-treat (ITT) approach. The ITT estimate is defined as the difference between the average outcomes for individuals referred to H2H (the treatment group) and those not referred to H2H (the control group), adjusting for prerandomization covariates.

All eligible individuals randomized to the treatment population will be counted in the treatment population, regardless of whether they engage with the service provider, pass the H2H housing screen, or obtain housing. All eligible individuals randomized to the control population will be counted in the control population, even if they enroll with the service provider or obtain housing.

The ITT estimate is measured as the average individual outcomes for the treatment population minus the average individual outcomes for the control population. We control for prerandomization

covariates using a regression framework. Specifically, the ITT estimate would be measured using the regression equation below:

$$Y_i = \alpha + \beta^T T_i + \sum_{n=1}^{N} \beta^n X_i^n + \varepsilon_i$$

where

Y_i is the number of jail days for each individual, *i*, who was randomly assigned;

T_i is an indicator equal to 1 for individuals who were assigned to the treatment group and 0 for individuals assigned to the control group;

β^T is the parameter of the ITT effect on the outcome (Y_i), the number of population members assigned to the treatment population and control population, respectively;

X^n is a vector of prerandomization covariates;

β^n is the vector of coefficients on the covariate, X^n; and

ε is the regression error term.

The inclusion of the prerandomization covariates is intended to improve the precision of the estimates. The initial proposed list of covariates to control for in the model is $X_i^1 \ldots X_i^{Nn}$: race, gender, age, number of stays in jail in the three years prior, number of days in jail in the three years prior, number of arrests in the three years prior, and entry type (Denver Health, contact, noncustodial arrest, or custodial arrest).

We will finalize the exact covariates after we review the historical data for data quality and completeness. In addition, the sample will be evaluated for equivalence between the treatment and control groups on observable prerandomization variables. Although random assignment is intended to create two equivalent groups, small samples can result in some differences between the groups by chance. Variables that show differences between the two groups at $p = .05$ (i.e., with at least 95 percent confidence that they are different) will be included as covariates in the regressions. Similar analysis for the related SIB evaluation included the following covariates:

- race/ethnicity
- age at randomization
- gender

- number of jail days in the three years prior to randomization
- number of jail stays in the three years prior to randomization
- number of arrests in the three years prior to randomization
- number of custodial arrests in the three years prior to randomization

The TOT estimate will be calculated using an instrumental variables (IV) estimate (Angrist, Imbens, and Rubin 1996). The IV estimate is per person served, among those who comply with their referral assignment, which accounts for the fact that some people referred to H2H may not enroll and that some people in the control group may end up receiving services from H2H. For example, all study participants can be divided into three types of individuals: those who will always enroll in H2H regardless of whether they are referred to it or not; those who will never enroll in H2H even if they are referred to it; and those who comply with whatever referral assignment they are given, whether it is to enroll in H2H or to remain in the control group. The IV estimate represents the effect of H2H enrollment on study outcomes among this third group, the compliers. In the special circumstance in which decisions to comply are independent of the study outcomes, the IV estimate also represents the average treatment effect.

The IV estimate scales up the ITT estimate by the difference between the treatment group's and the control group's fractions enrolled in H2H. Enrollment will be defined as the participant's having an initial housing lease-up (enrollment) date in SIB housing. Conceptually, Urban will estimate the effect of referring an individual to H2H on enrollment in H2H in exactly the same manner as calculating the ITT above, except that the dependent variable in the model will be enrollment:

$$P_i = \alpha + \delta^T T_i + \sum_{n=1}^{N} \delta^n X_i^n + \varepsilon_i$$

where

P_i is 1 if the individual, *i*, enrolled in the program, regardless of whether he or she was in the treatment group or the control group;

T_i is an indicator equal to 1 for individuals assigned to the treatment group and 0 for individuals assigned to the control group;

δ^T is the parameter of the effect of getting randomly assigned into treatment on actual enrollment (P_i);

X^n is a vector of prerandomization covariates;

δ^n is the vector of coefficients on the covariates, X^n; and

ε is the regression error term.

The IV estimate is the ratio of the two estimates:

$$\text{TOT estimate} = \frac{\beta^T}{\delta^T}$$

In practice, the two equations will be estimated simultaneously using a two-stage least squares estimation procedure. In the first stage, the dependent variable (enrolling in the program) is regressed on the exogenous covariates plus the instrument (randomization into treatment). In the second stage, fitted values from the first-stage regression are plugged directly into the structural equation in place of the endogenous regressor (enrolling in the program). We will include the same covariates as used in the ITT regression.

Because the payment schedule specifies the payment amount in per participant–served units, the IV estimate will be the basis for the performance-based outcome payments. The IV estimate also represents the per participant–served difference in mean jail days between the treatment and control groups, among those who comply with referral assignments.

DETERMINATION OF INDIVIDUALS INCLUDED IN JAIL DAY REDUCTION ANALYSES

For the interim payment, all individuals who have been randomly assigned to the treatment or control group for at least two years before the last day of the observation period (December 31, 2023) will be included for the ITT estimate of jail days. For the TOT estimate, we will define the treatment group as all individuals who leased up at least one year before the last day of the observation period (December 31, 2024). If any individuals have been in the defined treatment group for longer than two years, we will look at the first two years they were in the treatment group as defined for the analyses.

For the final payment, all individuals who have been randomly assigned to the treatment or control group for at least four years before the last day of the observation period (June 30, 2025) will be included for the ITT estimate of jail days. For the TOT estimate, we will define the treatment group as all individuals who leased up at least one year before the last day of the observation period (June 30, 2028). If any individuals have been in the defined treatment group for longer than four years, we will look at the first four years they were in the treatment group as defined for the analyses.

For both jail payments, however, referrals will continue past the ITT and TOT cutoffs (if and when housing slots are open), as individuals enrolled in the treatment group after that point will still be potentially eligible to generate housing stability payments.

The data sources and measures that will be used to calculate reduction in jail days are outlined in table 7. Jail days will be collected from the Denver Sheriff Department at least every six months as specified in the data-sharing timeline within the evaluation contract.

TABLE 7

Data Source and Measures for Calculating Reduction in Jail Days

Data source	Measures
Denver Sheriff Department	unique research ID jail entry date jail exit date facility

Source: Framework developed by Urban.

Early Outcomes Termination Process

If the H2H partnership agreement is terminated early, the outcome measurements for payment purposes, if appropriate as specified in the H2H contract, will be calculated for all participants meeting the payment requirements before the early termination quarter, as outlined in the H2H contract.

Minimum Detectable Effect Sizes

Based on our experience with the previous SIB evaluation, we expect approximately 16 percent of the supportive housing units to turn over every year and a take-up rate of approximately 75 percent. In table 8, we show minimum detectable effect sizes for the interim jail day report, the final jail day report, and the Medicaid outcomes final report. The interim jail day report will include all individuals randomized for SIPPRA through December 31, 2023. Given our assumptions and the lease-up timeline, we expect the sample size to be 328 individuals, with 164 in the treatment group and 164 in the control group. This sample size would allow us to detect effect sizes greater than 0.29. The final jail day report will include all individuals randomized for SIPPRA through June 30, 2025. We expect the sample to be 440 individuals, with 220 in the treatment and 220 in the control group, which would allow us to detect effect sizes greater than 0.25. Finally, for the Medicaid outcomes final report, we will include all individuals randomized before December 31, 2027. We expect the sample size to be 574 individuals, with 287 in the treatment group and 287 in the control group. This sample size would allow us to detect effect sizes of 0.21 or higher. Effect sizes of 0.2 or lower are considered small effect sizes, and those between 0.2 and 0.5 are considered medium.

TABLE 8

Minimum Detectable Effect Sizes

	Treatment	Control	Total	MDE
Jail day interim report	164	164	328	0.286
Jail day final report	220	220	440	0.247
Medicaid outcomes final report	287	287	574	0.216

Source: Urban analysis.

Notes: MDE = minimum detectable effect. Calculations are based on the following assumptions: alpha is 0.05, 80 percent power, a two-tailed test, and R-squared of 0.15.

Data Collection and Analytic Method for the Implementation Study

We will conduct the implementation study over the course of the evaluation by collecting and analyzing data at regular intervals. Early data collection, especially, will inform research design and evaluability. The implementation study will begin at enrollment and determine program flow—that is, the number of eligible individuals flowing through the initiative's intake points on any given day, week, or month. The implementation study also will collect data on how service providers locate and engage individuals in the treatment group. To understand how service providers locate and engage individuals, and how those individuals take up (or don't take up) the housing and services offered through the intervention, the implementation study will use tools such as an engagement dashboard and referral pipeline. These tools will be maintained in real time to inform both the research design and program model.

Answering research questions regarding program implementation and challenges will help identify important midcourse corrections. Identifying and evaluating the different program components is also critical to describing the entirety of the program model and interpreting the results obtained by the impact study.

Building from lessons from the process study component of the Denver SIB, we will assess the key components of the initiative, including the following:

- **Referral and intake process:** how individuals get to the program, how intake decisions are made, what tools are used, how the information collected by assessment tools is used, and how the process changes over time
- **Program components, requirements, and supportive services:** program duration and intensity; program features, rules, and restrictions; how program components compare with usual care services; how components change over time; what types of services are offered; how the

services are staffed and run; how providers design and implement services and how they differ from usual care; and how supportive services change over time for individuals

- **Data and client-tracking systems:** how service providers assess individuals over time, the nature and frequency of assessments and data monitoring by program, how data are used to influence program performance, and changes in these systems over time

In addition to describing these key components, we will collect information on the larger environment in which the program operates. The Denver H2H initiative will operate within the criminal justice system and other public systems that will have shifting processes for responding to the target population. We also will document the local housing market, which can create both opportunities and challenges for the program. Provider capacity may also differ. Some providers may be establishing new program models, while others may be launching enhanced versions of existing activities; thus, each provider will have different capacities and experience. We will examine how all of these factors affect program design and implementation.

Finally, we will document what constitutes "usual care" in the Denver community as the H2H program is implemented over time. In doing so, we will rely on the same components we use in describing the program model, including the absence of components (e.g., housing subsidies and certain types of supportive services). Understanding the counterfactual—what housing and services the individuals in the target populations are likely to receive in the absence of the program—is critical to interpreting the results of the evaluation.

We anticipate using the following qualitative data collection mechanisms:

- **Document review.** We will request program policy manuals, training tools, and other relevant documents generated by the service providers about their activities.
- **Observation.** We will observe select program components and partner coordination; for example, we will attend management meetings and program meetings.
- **In-person staff interviews and provider or partner focus groups.** We will conduct annual in-person interviews with program staff and other appropriate staff respondents.
- **Phone interviews and conference calls.** We will conduct regular calls to get program and evaluation updates and encourage coordination among all partners.

The semistructured interview and observation protocols we use during site visits to conduct interviews and focus groups with key informants and stakeholders will include discussion topics and questions that reflect key research areas, as will the tools used for extracting information from program

documents. We will use a qualitative analysis software package, such as NVivo, to organize and categorize key themes and issues. Results will be presented qualitatively and also converted into a few key quantitative measures to be included in the impact analysis. We will develop an effective way to share timely findings from the process study.

Data Security and Ownership

Data Security

Data that are not publicly available will be provided to Urban via secure file transfer protocol with password protection. This is the *only* acceptable method of providing data. The following methods are unacceptable: plain text email, US Postal Service with unencrypted CD-ROM, unsecure file transfer protocol, and all other methods that are not mentioned above.

Urban staff members will use PGP data encryption software to encrypt the administrative data file and to password protect the hard drive. If we need to make backup copies of restricted data files, we will encrypt the files before the backup takes place. All restricted data and extracts will be encrypted. All backups of data onto CDs or DVDs will be stored in a locked file cabinet in the researcher's office. Only research staff members who have signed confidentiality pledges will be allowed to access the data.

We will treat all data derived from restricted data in the same manner as the original restricted data. Data derived from restricted data include, but are not limited to, subsets of cases or variables from the original restricted data, numerical or other transformations of one or more variables from the original restricted data, and new variables constructed from the original data.

Data Ownership

Urban will have full ownership of all data we collect for this study. We are bound by Urban Institute Institutional Review Board–approved standards of confidentiality and will not be able to turn over raw data to the City and County of Denver, the intermediary (Corporation for Supportive Housing), investors, or any other stakeholders. In the event any of these entities requests an audit of the data to verify the outcomes reported by Urban, the requesting entity may select and fully pay for a qualified independent researcher to travel to Urban and conduct an audit of the data needed to verify the outcomes tied to the Denver H2H payment triggers. The qualified independent researcher must sign the confidentiality pledge signed by all members of the research team and operate under the same

Institutional Review Board standards of confidentiality as the research team. The qualified independent researcher would have access to only the data outlined in table 9 for verifying the outcomes tied to the Denver H2H payment triggers.

TABLE 9

Data for Outcome Verification for Denver Housing to Health Payment Triggers

Data source	Measures
Colorado Coalition for the Homeless and WellPower	unique research ID random assignment date client housing screen outcome and date client agreement to housing and date voucher application outcome and date voucher issuance date voucher denial date voucher denial reason lease-up date voucher loss reason and date
Denver Sheriff Department	unique research ID jail entry date jail exit date facility
Colorado Department of Health Care Policy and Financing	unique research ID beneficiary and provider enrollment service use claims and managed care data expenditure data

Source: Framework developed by Urban.

In the event that Urban's role as the independent evaluator is terminated and a new independent evaluator is selected, new data-sharing agreements must be negotiated between the new independent evaluator and each of the agencies from which data were collected before Urban can turn over any data to the new independent evaluator. It will be incumbent on the new independent evaluator to ensure that any necessary confidentiality and data security protocols are in place such that new data-sharing agreements can be signed with each administrative data agency to allow Urban to turn over any data already collected to the new independent evaluator.

Reports and Findings

Final reports and findings will be presented in aggregate form only. No data will be presented in such a way that individuals could be identified. Frequencies and cross-tabulations will be sufficiently aggregated to protect individuals from identification through unique combinations of sensitive

information and geographic identifiers. We may impose other restrictions based on our assessment of the data. All outcome reports will be publicly available, including findings from the implementation study. Urban may broadly disseminate publicly available findings through a variety of communication strategies, in collaboration with H2H partners and according to an agreed upon H2H communications protocol.

Destruction of Data

All data will be destroyed by December 2031, or two years after all publications have been finalized. Urban will use PGP data encryption software to permanently destroy all datasets in a way that renders them unreadable.

Project Monitoring and Outcome Reports

Project Monitoring

For project monitoring purposes, Urban will maintain a bimonthly engagement dashboard (appendix A) and a monthly pipeline dashboard (appendix B). Data for these dashboards will be collected bimonthly from CCH and WellPower as specified in the data-sharing agreements with each service provider. The bimonthly engagement dashboard will track individual-level data on participant engagement and on enrollment in the program. Those data will be used by the service providers and Urban to manage the randomization timeline and address any implementation challenges. Data from the engagement dashboard will be aggregated into a monthly pipeline dashboard that Urban will share with the City and County of Denver and the intermediary. The process for project monitoring will follow the schedule outlined in table 10.

TABLE 10
Project Monitoring Reports

Report name	Frequency and distribution	Description	Source
Engagement dashboard	bimonthly—data dashboard due to Urban twice per month	individual-level data of client engagement and enrollment	CCH, WellPower
Pipeline dashboard	monthly—data dashboard due to the City and County of Denver on the 15th of each month	aggregate number of referrals, assignments, and housing outcomes	Urban

Source: Framework developed by Urban.
Note: CCH = Colorado Coalition for the Homeless; Urban = Urban Institute.

Outcome Reports

Urban will submit outcome reports on housing stability starting in February 2024 for observations through December 31, 2023 and continuing annually thereafter, as indicated in table 11, through the end of the project in December 2029. Urban will report outcome measurements on jail days for interim and final payment purposes in April 2025 and October 2029, respectively. Outcome measurements for net reduction in federal expenditures will be reported in the final evaluation report in October 2029. Outcome reports will be structured similarly to those provided to the governance committee for the related Denver SIB (Cunningham et al. 2018a), including updates on project implementation (Cunningham et al. 2018b). The final outcome report for SIPPRA funding will be structured similarly to the steps and tables outlined in the outcome valuation attachment of the H2H SIPPRA application. The final Wind-Up Net Federal Expenditures Reductions Outcomes report will be delivered to the federal government in November 2029.

TABLE 11

Outcome Reports

	Housing Stability		Jail Days		Federal Outlays	
Outcome report delivered[a]	**Period of project under evaluation**	**Date outcomes observed through**	**Period of project under evaluation**	**Date outcomes observed through**	**Period of project under evaluation**	**Date outcomes observed through**
4/15/24	Q1–6	12/31/23				
4/15/25	Q7–10	12/31/24				
4/15/26	Q11–14	12/31/25	Q1–14	12/31/25	Q1–14[b]	12/31/25
4/15/27	Q15–18	12/31/26				
4/15/28	Q19–22	12/31/27				
4/15/29	Q23–26	12/31/28				
10/15/29	Q27–28	6/30/29	Q1–28	6/30/29	Q1–26	12/31/28

Source: Urban framework and project documents.

Notes: [a] Urban's ability to produce reports on time is dependent upon receiving accurate data from providers and other data-sharing agencies. Urban may request reasonable extensions for data delivery delays. Payment dates will be adjusted accordingly.
[b] This report will be an initial analysis of federal expenditures for an early cohort of participants and will not be used for payment purposes.

Appendix A. Bimonthly Engagement Dashboard

ID	Random assignment date	Transferred	Date located	Currently engaged
Unique research identifier	Random assignment date	Whether the client was transferred to or from CCH/WellPower	Date this client was first located	Is this person currently engaged? Y/N

Disengagement reason	Disengagement other reason	Passed housing screen	Locus
If this person is no longer being engaged, why?	Only fill out this column in case of Disengagement Reason = Other	Client passed H2H eligibility housing screen (Y-Chronic, Y-H2H definition, No)?	Level One: Recovery Maintenance and Health Management; Level Two: Low-Intensity Community-Based Services; Level Three: High-Intensity Community-Based Services; Level Four: Medically Monitored Nonresidential Services (ACT); Level Five: Medically Monitored Residential Services; Level Six: Medically Managed Residential Services

Date of housing orientation	Date of lease-up	Housing facility type	Housing type reason	Total months homeless directly before housing
date housing orientation completed		RPMC or scattered site?	client choice; client need; client eligibility; other	(reported at initial intake)

Date of exit 1	Exit 1 type	Exit 1 reason	Exit 1 reason other	Date of housing reentry after housing exit
	planned, unplanned, or AL	Planned exit housing for other permanent housing, residential treatment, prior offense incarceration, death? Leave blank if no exit. Unplanned exit for voluntary voucher loss, lease violation voucher loss, other voucher loss? Leave blank if no exit. AL exit for AL	Only fill out this column in the case of Exit 1 Reason = Other	

Date of exit 2	Exit 2 type	Exit 2 reason	Exit 2 reason other	Date of housing reentry after housing exit 2
	planned, unplanned, or AL	Planned exit housing for other permanent housing, residential treatment, prior offense incarceration, death? Leave blank if no exit. Unplanned exit for voluntary voucher loss, lease violation voucher loss, other voucher loss? Leave blank if no exit. AL exit for AL	Only fill out this column in the case of Exit 2 Reason = Other	

Date of exit 3	Exit 3 type	Exit 3 reason	Exit 3 reason other	Date of housing reentry after housing exit 3
	planned, unplanned, or AL	Planned exit housing for other permanent housing, residential treatment, prior offense incarceration, death? Leave blank if no exit. Unplanned exit for voluntary voucher loss, lease violation voucher loss, other voucher loss? Leave blank if no exit. AL exit for AL	Only fill out this column in the case of Exit 3 Reason = Other	

Date of exit 4	Exit 4 type	Exit 4 reason	Exit 4 reason other
	planned, unplanned, or AL	Planned exit housing for other permanent housing, residential treatment, prior offense incarceration, death? Leave blank if no exit. Unplanned exit for voluntary voucher loss, lease violation voucher loss, other voucher loss? Leave blank if no exit. AL exit for AL	Only fill out this column in the case of Exit 4 Reason = Other

Source: Framework developed by Urban.

Note: CCH=Colorado Coalition for the Homeless; H2H= Denver Housing to Health Pay for Success Project; AL=Assisted living.

Appendix B. Monthly Pipeline Dashboard

	Total	Feb. 22	Mar. 22	Apr. 22	May 22	Jun. 22	Jul. 22	Aug. 22
Referrals								
Total on eligibility list								
Individuals meeting criminal justice criteria								
Arrest								
Police contact								
Jail								
Individuals meeting criminal justice and emergency department visit criteria								
Eligible individuals randomized								
Control								
Treatment								
# Not found								
# Found								
Failed housing screen								
Passed housing screen								
Agreed to housing								
Refused program								
Found ineligible for voucher								
Housing								
# Available slots								
# Issued voucher								
# Not leased-up								
Still looking for housing								
Voucher expired								
Lost voucher								
Other								
# Leased-up								
# Exited housing								
Planned exit event								
Other permanent housing								
Residential treatment/other care								
Prior offense incarceration								
Death								
Unplanned exit event								
Lost voucher—voluntary								
Lost voucher—lease violation								
Lost voucher—incarceration								
Lost voucher—other								

Appendix C. SIPPRA H2H Housing Screen

Client Name: _____

Part I. Disabling Condition (*Check appropriate box(es)*):

- ❑ The person has a disability as defined in Section 223 of the Social Security Act of (42 USC 423)
- ❑ The person has a developmental disability as described by Section 102(7) of the Developmental Disabilities Assistance and Bill of Rights Act (42 USC 6001(7);
- ❑ The person has a physical, mental, or emotional impairment that
    1. is expected to be of long-continued and indefinite duration,
    2. substantially impedes his or her ability to live independently, and
    3. is of such a nature that ability to live independently could be improved by more suitable housing conditions.

Acceptable forms for documenting a person's disability status are as follows and must be completed by a licensed professional. *One of the following must be obtained:*

- ❑ Med-9 indicating permanent disabling condition for 12+ months
- ❑ Social Security Statement indicating disability status
- ❑ Signed disability verification form
- ❑ Signed letter (on letterhead) from social service agency confirming disability
- ❑ Hospital record stating disability or mental health diagnosis

Part II. Literal Homeless Status (*check ONE*):

- ❑ Has a primary nighttime residence that is a public or private place not meant for human habitation

- ❑ Is living in a publicly or privately operated shelter designated to provide temporary living arrangements (including congregate shelters, bridge housing, transitional housing, and hotels and motels paid for by charitable organizations or by federal, state, and local government programs)
- ❑ Is in rapid rehousing or supportive housing for homeless persons who were originally chronically homeless and came from the streets or emergency shelters and/or is in any of the above places but is spending a short time (up to 90 consecutive days) in a hospital or other institution
- ❑ Is exiting an institution where he or she resided for 90 days or less AND was residing in emergency shelter or a place not meant for human habitation immediately before entering institution
- ❑ Is an individual fleeing or attempting to flee domestic violence, dating violence, sexual assault, stalking, or other dangerous or life-threatening conditions related to violence who has no identified subsequent residence AND lacks the resources and support networks needed to obtain other permanent housing

Part III. Chronically Homeless Status (*check ONE*):

- ❑ The individual has been continuously homeless for a year or more.
- ❑ The individual has had four (4) episodes of homelessness in the last three (3) years that total at least 12 months (3 months self-report; 9 months third-party verification).
- ❑ The individual has a total of at least 12 months of homelessness in the past 3 years and meets DedicatedPlus criteria for Continuum of Care(CoC) programs (https://www.hudexchange.info/faqs/3284/what-is-a-dedicatedplus-project/).

Part II or III is supported by third-party certification that includes dates and locations of homelessness from one or more of the following (*check ALL that apply).* This third-party or narrative verification should include dates and locations of episodes of homelessness. Verification levels should be attempted in order from 1 through 4. As appropriate, written narratives should include date(s) attempted for third-party verification and date(s) completed.

First Level of Verification

- ❑ Signed third-party letter(s) on agency letterhead from a shelter worker, homeless service provider, outreach worker, or other healthcare or human service provider attesting to homelessness. Printouts from the Homeless Management Information System (HMIS) database documenting episode(s) of homelessness can be used with written narrative explaining such.

Second Level of Verification

- ❑ Signed written documentation on agency letterhead by intake worker of phone/in person/email conversations with a shelter worker, homeless service provider, outreach worker, or other healthcare or human service provider attesting to homelessness. Printouts from HMIS database documenting episode(s) of homelessness can be used with written narrative explaining such.

Third Level of Verification

- ❑ Signed written documentation on agency letterhead by intake worker of their observations of the client's housing history attesting to homelessness. Housing history should include length of stay at each place during the past 4 years if possible. Printouts from HMIS database documenting episode(s) of homelessness can be used with written narrative explaining such.

Fourth Level of Verification

- ❑ Signed and notarized written documentation by client of their homelessness status along with a housing history showing episode(s) of homelessness during the past 4 years.

Staff Name: _____

Staff Title: _____

Organization: _____

Signature: _____ Date: _____

Instructions: This Homelessness History Summary provides a suggested timeline to be used by individuals who receive funds for programs targeted to chronically homeless persons. It may be used to

analyze whether the chronology of a homeless person's history meets the time frame for the definition of chronic homelessness.

Time Period	Location/Narrative	Documentation? y/n

References

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