

Arizona Health Care Cost Containment System



## Arizona Section 1115 Waiver Evaluation

*Housing and Health Opportunities Evaluation Design*

August 2024



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## 1. Background

The Centers for Medicare & Medicaid Services (CMS) and federal law set standards for the minimum care states must provide Medicaid-eligible populations, while also giving states an opportunity to design and test their own strategies for funding and providing healthcare services. Section 1115 of the Social Security Act permits states to test innovative demonstration projects and evaluate state-specific policy changes to increase efficiency and reduce costs. On October 14, 2022, CMS approved Arizona’s request to extend its Section 1115 Arizona Health Care Cost Containment System (AHCCCS) Demonstration Waiver (the Waiver). The extension was approved for an additional five years effective October 14, 2022, through September 30, 2027.<sup>1-1</sup> The following eight Waiver programs were implemented or extended:<sup>1-2</sup>

- AHCCCS Complete Care (ACC)
- AHCCCS Complete Care–Regional Behavioral Health Agreement (ACC-RBHA)
- Arizona Long Term Care System (ALTCS)
- Comprehensive Health Plan (CHP)
- Housing and Health Opportunities (H2O)
- Prior Quarter Coverage (PQC) Waiver
- Targeted Investments (TI) 2.0
- Tribal Dental Authority

### H2O Program Background

Arizona’s pre-existing housing programs follow a permanent supportive housing (PSH) model to address and improve health outcomes for individuals experiencing homelessness, including those with a serious mental illness (SMI), physical health (PH) conditions, or substance use disorder (SUD). Housing subsidies and the integration of individual wraparound services and housing/tenancy supports ensure members can secure and maintain housing while simultaneously addressing their health and service needs. In state fiscal year (SFY) 2020, AHCCCS determined that the PSH model decreased emergency department (ED) visits, inpatient (IP) admissions, and behavioral health (BH) residential facility admissions, in addition to a reduction in per-member per-month (PMPM) costs. Prior to the H2O program, AHCCCS housing funds were administered through three Regional Behavioral Health Authority (RBHA) managed care organizations (MCOs) responsible for specific geographic service areas (GSAs).

On May 26, 2021, AHCCCS applied for the H2O amendment to the Waiver to address continuing gaps in the AHCCCS’ housing delivery system, including increasing PSH availability and expanding services.<sup>1-3</sup> On October

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<sup>1-1</sup> Centers for Medicare & Medicaid Services. AHCCCS Demonstration Extension and Housing & Health Opportunities Amendment Approval. Available at: <https://www.medicaid.gov/medicaid/section-1115-demonstrations/downloads/az-hccc-ca-10142022.pdf>. Accessed on: Nov 8, 2023.

<sup>1-2</sup> The evaluation design for ACC, ACC-RBHA, ALTCS, CHP, and Tribal Dental Authority was submitted to CMS on September 29, 2023. This document presents the evaluation design for the H2O program only. A separate evaluation design will be submitted for TI 2.0.

<sup>1-3</sup> Centers for Medicare and Medicaid Services. Amendment Application – Housing and Health Opportunities Amendment. Available at: <https://www.medicaid.gov/medicaid/section-1115-demonstrations/downloads/az-hccc-pa9.pdf>. Accessed on: Nov 8, 2023.

14, 2022, CMS approved the H2O amendment to the Waiver, effective October 14, 2022, through September 30, 2027. The program will be officially implemented on October 1, 2024. H2O will enhance and expand housing services and interventions for AHCCCS members with an SMI, a chronic health condition, and who are homeless or at risk of becoming homeless to ensure members attain safe housing and integrated services. The H2O program intends to achieve its goals through three core strategies:

1. Strengthening homeless outreach and service engagement.
2. Securing housing funding for members who are homeless or at-risk of homelessness.
3. Enhancing wraparound services and supports to ensure housing stability for improved health outcomes, reduced recidivism, and reduced decompensation.

Under the H2O program, housing administrative functions are subcontracted to a single statewide H2O-Program Administrator (H2O-PA). The clinical assessments for PSH eligibility and need, care coordination, and delivery of wraparound services will remain under the control of the MCOs. Services covered under H2O include outreach and education services, transitional housing services, one-time transition and moving costs, and housing pre-tenancy and tenancy services. AHCCCS' strategy will seek to utilize evidence based PSH practices to increase positive health outcomes for target members; reduce cost of care for housed members; reduce homelessness; improve skills to maintain housing stability; and integrate, support, and leverage existing AHCCCS and community initiatives, programs, and expertise to ensure a full continuum of services and supports.

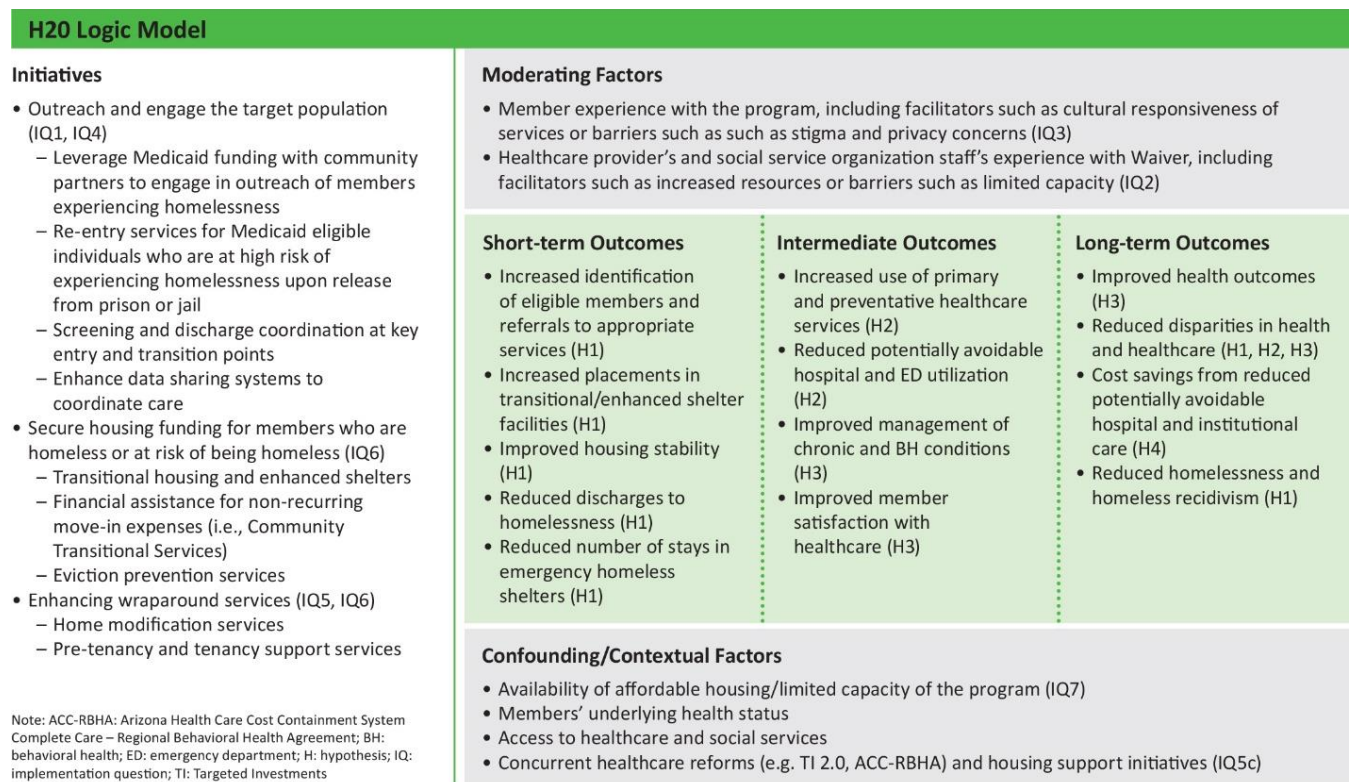
## 2. Evaluation Questions and Hypotheses

This section provides the logic model, hypotheses, and research questions, which focus on evaluating the impact of the Housing and Health Opportunities (H2O) program of Arizona’s Section 1115 Arizona Health Care Cost Containment System’s (AHCCCS’) Demonstration Waiver (the Waiver).

### Logic Model

Figure 2-1 illustrates that, given funding for the H2O demonstration, outreach and engagement will increase the identification of eligible members and referrals to appropriate services. By securing housing funding for members who are homeless or at risk of being homeless and enhancing wrap around services, the number of stays in emergency homeless shelters and discharges to homelessness should be reduced as housing stability improves. Members will increase their use of primary and preventive services, reducing avoidable emergency department (ED) visits, improving the management of chronic and behavioral health (BH) conditions, and increasing member satisfaction with their care. In the long term, this is expected to improve health outcomes, reduce disparities in health and healthcare, save costs, and reduce homelessness and homeless recidivism.

**Figure 2-1—H2O Logic Model**



## Hypotheses and Research Questions

To comprehensively evaluate H2O, four hypotheses will be tested using twenty research questions. Table 2-1 lists the hypotheses.

**Table 2-1—H2O Hypotheses**

H2O Hypotheses	
1	The demonstration will meet or reduce the severity of HRSN for members overall and among subpopulations who experience disparities in HRSN.
2	By meeting or reducing the severity of HRSN, the demonstration will increase members’ use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care (ED visits, inpatient [IP] care, and nursing facilities), leading to reduced healthcare spending over time. Impacts will be realized overall and among subpopulations who experience disparities in hospital and institutional care use.
3	By meeting or reducing HRSN, the demonstration will improve physical and mental health outcomes among members overall and among subpopulations who experience disparities in physical and mental health outcomes.
4	The H2O demonstration will reduce cost of care for members who utilize H2O services.

Hypothesis 1 seeks to assess whether H2O will meet or reduce the severity of HRSN for members participating in the program. The research questions and associated measures for Hypothesis 1 are presented in Table 2-2.

**Table 2-2—Hypothesis 1 Research Questions and Measures**

Hypothesis 1: The demonstration will meet or reduce the severity of HRSN for members overall and among subpopulations who experience disparities in HRSN	
<b>Research Question 1.1: How does the H2O demonstration impact the use of HRSN services?</b>	
1-1	Percentage of members experiencing homelessness who were contacted
1-2	Percentage of members participating in H2O who completed an intake and received a service within seven days of enrollment
1-3	Percentage of members eligible for H2O, who are participating in the H2O program
1-4	Percentage of members participating in H2O who completed an assessment who established a housing care plan
	Percentage of members participating in H2O, who are receiving H2O services (any service and by service category)
1-5	<ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul>
1-6	Number of members on the AHCCCS Housing Program (AHP) waitlist who are also H2O eligible
1-7	Percentage of members referred to receive short term rental assistance who locate housing within 120 days
1-8	Number of enhanced shelter bed inventory statewide
<b>Research Question 1.2: How do State and local government investments in housing supports change in relation to H2O demonstration funding?</b>	
1-9	Change in investment of housing interventions outside of the demonstration

**Hypothesis 1: The demonstration will meet or reduce the severity of HRSN for members overall and among subpopulations who experience disparities in HRSN**

**Research Question 1.3: How does the H2O demonstration impact rates of HRSN and their severities?**

1-10	Percentage of members who participated in H2O services that received an HRSN/social determinants of health (SDOH) screening with the Protocol for Responding to and Assessing Patients’ Assets Risks, and Experiences (PRAPARE) screening tool or other appropriate screening tool
1-11	Percentage of members who participated in H2O services that had an HRSN identified, among those who received an HRSN/SDOH screening
1-12	Percentage of members who had a housing-related need identified, among those who received an HRSN/SDOH screening
1-13	Number of unique H2O referrals sent to providers by the H2O-PA (any referral and referral type) <ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul>
1-14	Percentage of members participating in H2O who were connected to a Regional Behavioral Health Agreement (RBHA) permanent supportive housing (PSH) provider for ongoing supportive services
1-15	Percent of members with substance use disorder (SUD) diagnosis participating in H2O who connect to outpatient (OP) SUD/recovery services
1-16	Percent of members indicating they were not able to pay mortgage, rent or utility bills in the last three months
1-17	Percent of members indicating that a utility company threatened to shut off services in the past three months
1-18	Percent of members participating in H2O who are enrolled in the Supplemental Nutrition Assistance Program (SNAP) or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

**Research Question 1.4: How does the H2O demonstration impact members’ use of HRSN services reflecting crisis events, such as stays in emergency homeless shelters?**

1-19	Number of stays in an emergency shelter per 1,000 members
1-20	Number of days in an emergency shelter or state of unsheltered homelessness per 1,000 members
1-21	Percentage of members reporting they used an emergency shelter in the last six months
1-22	Percentage of members reporting they slept in a place not meant for human habitation in the last six months

**Research Question 1.5: Is the H2O demonstration associated with increased positive health and wellbeing outcomes?**

1-23	Percentage of members with housing retention, among members participating in H2O who utilize pre-tenancy/tenancy services
1-24	Percentage of members who exit to permanent housing, among members participating in H2O who utilize enhanced shelter services
1-25	Percentage of members participating in H2O whose housing condition was upgraded during the past month
1-26	Percentage of members participating in H2O who are leaving the H2O program, stratified by the following reasons: <ul style="list-style-type: none"> <li>• Positive exit reasons: Completed Program, Voluntary Withdrawal</li> <li>• Negative exit reasons: Abandonment, Failure to Locate Housing, Non-Compliance, Failure to Recertify, Incarcerated, Unknown</li> <li>• Neutral: Higher Level of Care, Deceased</li> </ul>
1-27	Percentage of members participating in H2O who reported employment during engagement

**Hypothesis 1: The demonstration will meet or reduce the severity of HRSN for members overall and among subpopulations who experience disparities in HRSN**

- 1-28 Percentage of members participating in H2O who increased employment during past month
- 1-29 Change in income among members participating in H2O who utilize pre-tenancy/tenancy services

**Research Question 1.6: How does the H2O demonstration impact disparities in HRSN?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations

**Research Question 1.6.1: Does the H2O demonstration mitigate or reduce HRSN among groups who had high rates at baseline?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations

**Research Question 1.6.2: Do any groups experience increasing or worsening HRSN compared to the baseline with the implementation of the H2O demonstration?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations

Hypothesis 2 is designed to determine whether H2O will increase members’ use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care, including ED visits, inpatient (IP) admissions, and nursing facilities. This is hypothesized to lead to reduced healthcare spending over time. The research questions and associated measures for Hypothesis 2 are presented in Table 2-3.

**Table 2-3—Hypothesis 2 Research Questions and Measures**

**Hypothesis 2: By meeting or reducing the severity of HRSN, the demonstration will increase members’ use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care (ED visits, IP care, and nursing facilities), leading to reduced healthcare spending over time. Impacts will be realized overall and among subpopulations who experience disparities in hospital and institutional care use.**

**Research Question 2.1: How does the H2O demonstration impact the use of preventive and routine care?**

- 2-1 Percentage of adults who accessed preventive/ambulatory health services
- 2-2 Percentage of members who have a primary care provider (PCP) visit since their intake date, among members participating in H2O who utilize enhanced shelter services
- 2-3 Percentage of adults with a flu vaccine
- 2-4 Percentage of adult members with a cervical cancer screening
- 2-5 Percentage of adult members with a breast cancer screening
- 2-6 Percent of adult members with a colorectal cancer screening
- 2-7 Percentage of members that were provided a most effective or moderately effective method of contraception
- 2-8 Percentage of members that received a prenatal and/or postpartum care visit
- 2-9 Percentage of members with a diagnosis of human immunodeficiency virus (HIV) who did not have a medical visit in the last six months of the measurement year

**Research Question 2.2: How does the H2O demonstration impact the use of BH services?**

- 2-10 Percentage of members who had initiation of alcohol and other drug abuse or dependence treatment
- 2-11 Percentage of members who had engagement of alcohol and other drug abuse or dependence treatment
- 2-12 Percentage of members with a follow-up visit after hospitalization for mental illness
- 2-13 Percentage of members with a follow-up visit after ED visit for members with multiple high-risk chronic conditions
- 2-14 Percentage of members with follow-up after ED visit for alcohol and other drug abuse or dependence
- 2-15 Percentage of members who remained on antidepressant medication treatment



**Hypothesis 2: By meeting or reducing the severity of HRSN, the demonstration will increase members’ use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care (ED visits, IP care, and nursing facilities), leading to reduced healthcare spending over time. Impacts will be realized overall and among subpopulations who experience disparities in hospital and institutional care use.**

2-16	Percentage of members with opioid use disorder (OUD) who filled a prescription for or were administered or dispensed a United States Food and Drug Administration (FDA)-approved medication for the disorder
2-17	Percentage of members with schizophrenia who adhered to antipsychotic medications
2-18	Percentage of members who reported a substance use problem who experienced improvement on Brief Assessment of Recovery Capital (BARC)-10

**Research Question 2.3: How does the H2O demonstration impact the use of hospital and institutional care?**

2-19	Number of emergent ED visits per 1,000 member months
2-20	Number of non-emergent ED visits per 1,000 member months
2-21	Number of IP stays per 1,000 member months
2-22	Risk-adjusted ratio of observed to expected acute IP and observation stay discharges
2-23	Chronic conditions composite
2-24	Percentage of members with an ED visit for hypoglycemia among older adults with diabetes
2-25	Percentage of members with admission to an institution from the community
2-26	Percent of members who were hospitalized for potentially preventable complications
2-27	Percentage of adult IP discharges with an unplanned readmission within 30 days

**Research Question 2.4: How does the H2O demonstration impact disparities in the use of hospital and institutional care?**

All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations

**Research Question 2.4.1: Does the demonstration reduce the use of hospital and institutional care among groups who had high rates at baseline?**

All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations

**Research Question 2.4.2: Do any groups experience increasing use of hospital and institutional care compared to the baseline with the implementation of the HRSN demonstration?**

All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations

One of the primary strategies of H2O is enhancing wraparound services and supports to ensure housing stability for improved health outcomes which will be assessed by Hypothesis 3. The research questions and associated measures for Hypothesis 3 are presented in Table 2-4.

**Table 2-4—Hypothesis 3 Research Questions and Measures**

**Hypothesis 3: By meeting or reducing HRSN, the demonstration will improve physical and mental health outcomes among members overall and among subpopulations who experience disparities in physical and mental health outcomes.**

**Research Question 3.1: How does the H2O demonstration impact members’ physical and mental health outcomes?**

3-1	Percentage of members who reported a rating of overall health as very good or excellent
3-2	Percentage of members who reported a rating of overall mental or emotional health as very good or excellent
3-3	Percentage of members who reported a rating of life satisfaction as “Satisfied” or “Very Satisfied”
3-4	Percentage of members who reported “Always” or “Usually” feeling stressed or anxious
3-5	Percentage of births with low birth weight

**Hypothesis 3: By meeting or reducing HRSN, the demonstration will improve physical and mental health outcomes among members overall and among subpopulations who experience disparities in physical and mental health outcomes.**

**Research Question 3.2: How does the H2O demonstration impact members' management of chronic conditions?**

- 3-6 Percentage of members with diabetes with poor hemoglobin control
- 3-7 Percentage of members with persistent asthma who had a ratio of controller medications to total asthma medications of at least 50 percent
- 3-8 Percentage of members with clinical atherosclerotic cardiovascular disease who received and adhered to statin therapy

**Research Question 3.3: How does the H2O demonstration impact rates of mortality?**

- 3-9 All-cause mortality rate
- 3-10 Maternal mortality rate

**Research Question 3.4: How does the H2O demonstration impact the quality and effectiveness of downstream services?**

- 3-11 Quality and effectiveness of key downstream services of the H2O program

**Research Question 3.5: How does the H2O demonstration impact disparities in health outcomes?**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations

**Research Question 3.5.1: Does the H2O demonstration improve the physical and mental health outcomes of groups who had poor health outcomes at baseline?**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations

**Research Question 3.5.2: Do any groups experience worsening physical and mental health outcomes compared to the baseline with the implementation of the H2O demonstration?**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations

Hypothesis 4 is designed to measure the cost of care for members who utilize H2O services. The research questions and associated measures for Hypothesis 4 are presented in Table 2-5.

**Table 2-5—Hypothesis 4 Research Questions and Measures**

**Hypothesis 4: The H2O demonstration will reduce cost of care for members who utilize H2O services.**

**Research Question 4.1: How does the H2O demonstration impact the total cost of care among H2O members compared to members who are eligible but not participating in the H2O demonstration?**

- 4-1 Total cost of care, stratified by type the following categories:
  - All facility costs
  - IP facility costs
  - Professional services costs
  - Pharmacy costs
  - Physical health (PH) costs
  - BH costs
- 4-2 Total cost of care by key subpopulations (age, sex, sexual orientation, gender identity, race/ethnicity, English language proficiency, primary language, disability status, geography, eligibility category, HRSN domains, high-cost high-needs)

### 3. Methodology

To assess the impact of the Housing and Health Opportunities (H2O) program of the Arizona Health Care Cost Containment System (AHCCCS) Section 1115 Demonstration Waiver (the Waiver), a comparison of outcomes between the intervention group and a valid counterfactual—the intervention group that had not been exposed to the intervention—must be made. The gold standard for experimental design is a randomized controlled trial which would be implemented by first identifying an intervention population, and then randomly assigning individuals to the intervention and the rest to a comparison group, which would serve as the counterfactual. However, random assignment is rarely feasible or desirable in practice, particularly as it relates to healthcare policies.

As such, a variety of quasi-experimental or observational methodologies have been developed for evaluating the effect of policies on outcomes. The research questions presented in the previous section will be addressed using at least one of these methodologies. The selected methodology depends on data availability factors relating to: (1) data to measure the outcomes, (2) data for a valid comparison group, and (3) data during the time periods of interest—typically defined as the year prior to implementation and annually thereafter. Table 3-1 illustrates a sampling of standard analytic approaches and whether the approach requires data gathered at the baseline (i.e., pre-implementation); requires a comparison group; or allows for causal inference to be drawn. It also notes key requirements unique to a particular approach.

**Table 3-1—Sampling of Analytic Approaches**

Analytic Approach	Baseline Data	Comparison Group	Allows Causal Inference	Notes
<b>Descriptive Time Series</b>				Relies on sufficient data points prior to and following implementation
<b>Difference-in-Differences</b>	✓	✓	✓	Trends in outcomes should be similar between comparison and intervention groups at baseline
<b>Interrupted Time Series</b>	✓		✓	Requires sufficient data points prior to and following implementation
<b>Pre-Test/Post Test</b>	✓			

Note: Descriptions of each analytic approach can be found in the Analytic Methods section below.

### Evaluation Design Summary

H2O is scheduled to be implemented on October 1, 2024, and will be available to all adult Medicaid members who meet the eligibility criteria of (1) currently experiencing homelessness, (2) having a serious mental illness (SMI) designation, and (3) having a chronic health condition or currently in a correctional health facility with a scheduled release date. The evaluation period will generally cover October 1, 2024, through the remainder of the demonstration period (September 31, 2027); however, the specific pre- and post-implementation period will vary for the intervention group members.

The intervention group will consist of members participating in H2O. As members may enter the H2O program at various time points following implementation on October 1, 2024, each member will have a unique pre-intervention and post-intervention period. The period prior to their enrollment in the H2O program will be defined as the pre-intervention period. The period occurring after their enrollment in H2O will be defined as the post-intervention period.

Where appropriate, measures will incorporate a comparison group of H2O eligible members who have not participated in H2O, or who are on the AHCCCS Housing Program (AHP) housing waitlist. The evaluation period for comparison group members will cover October 1, 2024, through the remainder of the demonstration period (September 30, 2027), and the baseline period will be defined as the three years prior to the implementation of the H2O program: October 1, 2021, through September 30, 2024. The baseline period allows for several years of pre-implementation data while avoiding much of the coronavirus disease 2019 (COVID-19) public health emergency (PHE) impact in calendar year (CY) 2020 and early CY 2021. Additionally, the evaluator will consider methods to align pre- and post-intervention exposure time such that the amount of time an individual can be assessed for outcomes is similar between the intervention and comparison groups.

If there is sufficient sample size, then propensity score matching may be used to further identify members in the comparison group with demographic and health characteristics that are similar to those in the H2O program. The independent evaluator may consider including variables such as age, sex, race, ethnicity, language, and the Chronic Illness and Disability Payment System (CDPS) risk score, among others, in the propensity score model.

For measures that are calculated on an annual basis, the primary analytic approach will be a difference-in-differences (DiD) analysis comparing the H2O program members with a comparison group of H2O eligible members who are not participating in H2O or on the AHP waitlist. For measures that may be calculated on a quarterly or monthly basis, the evaluator will consider a comparative interrupted time series (ITS) approach.

## Intervention and Comparison Populations

The intervention population will consist of members participating in H2O. The independent evaluator will work with AHCCCS to identify the best method for identifying the intervention group. This may include utilizing exception codes on members' records, in combination with utilization of H2O service codes. To be included in the intervention group, members will need to have at least one full quarter of Medicaid enrollment data in the pre-intervention and post-intervention periods.

The comparison population will consist of H2O eligible members who have not participated in H2O, or who are on the AHP waitlist. If there is a sufficient sample size of comparison individuals, then further refinement of the comparison group may utilize propensity-score matching to identify a suitable comparison member for each H2O member. Members in the comparison will need to have at least one full quarter of Medicaid enrollment in the pre-intervention and post-intervention periods to be included.

## Evaluation Periods

Table 3-2 presents the baseline and evaluation periods of H2O for the intervention and comparison populations.

**Table 3-2—H2O Evaluation Periods**

Evaluation Periods	Time Frame
Baseline	<b>Intervention:</b> The three years prior to enrollment in H2O
	<b>Comparison:</b> October 1, 2021–September 31, 2024
Evaluation	<b>Intervention:</b> The period following enrollment in H2O through September 31, 2027
	<b>Comparison:</b> October 1, 2024–September 31, 2027

## Evaluation Measures

Table 3-3 presents the evaluation measures along with the respective hypotheses, research questions, comparison groups, data sources, and analytic approaches for H2O.

**Table 3-3—H2O Evaluation Measures**

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Hypothesis 1: The demonstration will meet or reduce the severity of HRSN for members overall and among subpopulations who experience disparities in HRSN.</b>				
<b>Research Question 1.1:</b> How does the H2O demonstration impact the use of HRSN services?	1-1: Percentage of members experiencing homelessness who were contacted	N/A	Deliverable submitted to AHCCCS by the H2O-PA	Descriptive time series
	1-2: Percentage of members participating in H2O who completed an intake and received a service within seven days of enrollment	N/A	Deliverable submitted to AHCCCS by the H2O-PA	Descriptive time series
	1-3: Percentage of members eligible for H2O, who are participating in the H2O program	N/A	Claims/encounter data	Descriptive time series
	1-4: Percentage of members participating in H2O who completed an assessment who established a housing care plan	N/A	Deliverable submitted to AHCCCS by the H2O-PA	Descriptive time series

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach		
	1-5: Percentage of members participating in H2O, who are receiving H2O services (any service and by service category)	N/A	<ul style="list-style-type: none"> <li>- AHCCCS/H2O list of members receiving services</li> <li>- Claims/encounter data</li> <li>- Outreach is through provider invoicing process</li> </ul>	Descriptive time series		
	<ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul>					
	1-6: Number of members on the AHP waitlist who are also H2O eligible				AHP housing waitlist	Descriptive time series
	1-7: Percentage of members referred to receive short term rental assistance who locate housing within 120 days				Deliverable submitted to AHCCCS by the H2O-PA	Descriptive time series
	1-8: Number of enhanced shelter bed inventory statewide	N/A	HUD HDX HIC and PIT data	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> </ul>		
<b>Research Question 1.2:</b> How do State and local government investments in housing supports change in relation to H2O demonstration funding?	1-9: Change in investment of housing interventions outside of the demonstration	N/A	<ul style="list-style-type: none"> <li>- Key informant interviews</li> <li>- AHCCCS reports</li> </ul>	<ul style="list-style-type: none"> <li>- Qualitative synthesis</li> <li>- Descriptive analysis</li> </ul>		
<b>Research Question 1.3:</b> How does the H2O demonstration impact rates of HRSN and their severities?	1-10: Percentage of members who participated in H2O services that received an HRSN/SDOH screening with the PRAPARE screening tool or other appropriate screening tool	N/A	<ul style="list-style-type: none"> <li>- Claims/encounter data (G codes, Z codes, and HCPCS codes)</li> <li>- CLRS</li> <li>- Other standardized screening tools</li> <li>- Supplemental data from AHCCCS as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>- Repeated cross-sectional design</li> <li>- Descriptive time series</li> <li>- ITS</li> </ul>		

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
	1-11: Percentage of members who participated in H2O services that had an HRSN identified, among those who received an HRSN/SDOH screening	N/A	<ul style="list-style-type: none"> <li>- Claims/encounter data (G codes, Z codes, and HCPCS codes)</li> <li>- CLRS</li> <li>- Other standardized screening tools</li> <li>- Supplemental data from AHCCCS as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>- Repeated cross-sectional design</li> <li>- Descriptive time series</li> <li>- ITS</li> </ul>
	1-12: Percentage of members who had a housing-related need identified, among those who received an HRSN/SDOH screening	N/A	<ul style="list-style-type: none"> <li>- Claims/encounter data (G codes, Z codes, and HCPCS codes)</li> <li>- CLRS</li> <li>- Other standardized screening tools</li> <li>- Supplemental data from AHCCCS as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>- Repeated cross-sectional design</li> <li>- Descriptive time series</li> <li>- ITS</li> </ul>
	1-13: Number of unique H2O referrals sent to providers by H2O-PA (any referral and referral type) <ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul>	N/A	<ul style="list-style-type: none"> <li>- H2O referral lists (H2O-PA)</li> <li>- CLRS</li> <li>- Supplemental data from AHCCCS as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> </ul>
	1-14: Percentage of members participating in H2O who were connected to a RBHA PSH provider for ongoing supportive services	N/A	Deliverable submitted to AHCCCS by the H2O-PA	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> </ul>

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
	1-15: Percent of members with SUD diagnosis participating in H2O who connect to OP SUD/recovery services	N/A	- Deliverable submitted to AHCCCS by the H2O-PA - Claims/encounter data	- Pre-test/post-test - ITS
	1-16: Percent of members indicating they were not able to pay mortgage, rent or utility bills in the last three months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	- Chi-square - Comparison of means
	1-17: Percent of members indicating that a utility company threatened to shut off services in the past three months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	- Chi-square - Comparison of means
	1-18: Percent of members who are enrolled in SNAP or WIC	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- ADHS and DES SNAP and WIC data - Claims/encounter data	Repeated cross-sectional design
<b>Research Question 1.4:</b> How does the H2O demonstration impact members' use of HRSN services reflecting crisis events, such as stays in emergency homeless shelters?	1-19: Number of stays in an emergency shelter per 1,000 members	N/A	- HUD HDX HIC and PIT data - Data from COCs	- Pre-test/post-test - ITS
	1-20: Number of days in an emergency shelter or state of unsheltered homelessness per 1,000 members	N/A	HUD HDX HIC and PIT data	- Pre-test/post-test - ITS
	1-21: Percentage of members reporting they used an emergency shelter in the last six months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- Beneficiary survey - Deliverable submitted to AHCCCS by the H2O-PA	- Chi-square - Comparison of means
	1-22: Percentage of members reporting they slept in a place not meant for human habitation in the last six months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	- Chi-square - Comparison of means



Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Research Question 1.5:</b> Is the H2O demonstration associated with increased positive health and wellbeing outcomes?	1-23: Percentage of members with housing retention, among members participating in H2O who utilize pre-tenancy/tenancy services	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-24: Percentage of members who exit to permanent housing, among members participating in H2O who utilize enhanced shelter services	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-25: Percentage of members participating in H2O whose housing condition was upgraded during the past month	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-26: Percentage of members participating in H2O who are leaving the H2O program, stratified by the following reasons: <ul style="list-style-type: none"> <li>Positive exit reasons: Completed Program, Voluntary Withdrawal</li> <li>Negative exit reasons: Abandonment, Failure to Locate Housing, Non-Compliance, Failure to Recertify, Incarcerated, Unknown</li> <li>Neutral: Higher Level of Care, Deceased</li> </ul>	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-27: Percentage of members participating in H2O who reported employment during engagement	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-28: Percentage of members participating in H2O who increased employment during past month	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS
	1-29: Change in income among members participating in H2O who utilize pre-tenancy/tenancy services	N/A	Deliverable submitted to AHCCCS by the H2O-PA	- Pre-test/post-test - ITS

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Research Question 1.6:</b> How does the H2O demonstration impact disparities in HRSN?				
<b>Research Question 1.6.1:</b> Does the H2O demonstration mitigate or reduce HRSN among groups who had high rates at baseline?	All the above Hypothesis 1 measures for use of HRSN services by key subpopulations	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Claims/encounter data</li> <li>- Contexture race and ethnicity data</li> </ul>	Health equity analysis
<b>Research Question 1.6.2:</b> Do any groups experience increasing or worsening HRSN compared to the baseline with the implementation of the H2O demonstration?				
<b>Hypothesis 2: By meeting or reducing the severity of HRSN, the demonstration will increase members' use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care (ED visits, IP care, and nursing facilities), leading to reduced healthcare spending over time. Impacts will be realized overall and among subpopulations who experience disparities in hospital and institutional care use.</b>				
<b>Research Question 2.1:</b> How does the H2O demonstration impact the use of preventive and routine care?	2-1: Percentage of adults who accessed preventive/ambulatory health services	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Claims/encounter data</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> <li>- DiD</li> </ul>
	2-2: Percentage of members who have a PCP visit since their intake date, among members participating in H2O who utilize enhanced shelter services	N/A	Deliverable submitted to AHCCCS by the H2O-PA	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> </ul>
	2-3: Percentage of adults with a flu vaccine	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	<ul style="list-style-type: none"> <li>- Chi-square</li> <li>- Comparison of means</li> </ul>
	2-4: Percentage of adult members with a cervical cancer screening	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Claims/encounter data</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> <li>- DiD</li> </ul>
	2-5: Percentage of adult members with a breast cancer screening	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Claims/encounter data</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> <li>- DiD</li> </ul>

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
	2-6: Percent of adult members with a colorectal cancer screening	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-7: Percentage of members that were provided a most effective or moderately effective method of contraception	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-8: Percentage of members that received a prenatal and/or postpartum care visit	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-9: Percentage of members with a diagnosis of HIV who did not have a medical visit in the last six months of the measurement year	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
<b>Research Question 2.2:</b> How does the H2O demonstration impact the use of BH services?	2-10: Percentage of members who had initiation of alcohol and other drug abuse or dependence treatment	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-11: Percentage of members who had engagement of alcohol and other drug abuse or dependence treatment	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-12: Percentage of members with a follow-up visit after hospitalization for mental illness	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
	2-13: Percentage of members with a follow-up visit after ED visit for members with multiple high-risk chronic conditions	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-14: Percentage of members with follow-up after ED visit for alcohol and other drug abuse or dependence	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-15: Percentage of members who remained on antidepressant medication treatment	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-16: Percentage of members with OUD who filled a prescription for or were administered or dispensed an FDA-approved medication for the disorder	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-17: Percentage of members with schizophrenia who adhered to antipsychotic medications	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-18: Percentage of members who reported a substance use problem who experienced improvement on BARC-10	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Deliverable from RBHA	- Pre-test/post-test - ITS
<b>Research Question 2.3:</b> How does the H2O demonstration impact the use of hospital and institutional care?	2-19: Number of emergent ED visits per 1,000 member months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
	2-20: Number of non-emergent ED visits per 1,000 member months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-21: Number of IP stays per 1,000 member months	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-22: Risk-adjusted ratio of observed to expected acute IP and observation stay discharges	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-23: Chronic conditions composite	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-24: Percentage of members with an ED visit for hypoglycemia among older adults with diabetes	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-25: Percentage of members with admission to an institution from the community	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	2-26: Percent of members who were hospitalized for potentially preventable complications	N/A	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS
	2-27: Percentage of adult IP discharges with an unplanned readmission within 30 days	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Research Question 2.4:</b> How does the H2O demonstration impact disparities in the use of hospital and institutional care?	All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Claims/encounter data</li> <li>- Contexture race and ethnicity data</li> </ul>	Health equity analysis
<b>Research Question 2.4.1:</b> Does the demonstration reduce the use of hospital and institutional care among groups who had high rates at baseline?				
<b>Research Question 2.4.2:</b> Do any groups experience increasing use of hospital and institutional care compared to the baseline with the implementation of the HRSN demonstration?				
<b>Hypothesis 3: By meeting or reducing HRSN, the demonstration will improve physical and mental health outcomes among members overall and among subpopulations who experience disparities in physical and mental health outcomes.</b>				
<b>Research Question 3.1:</b> How does the H2O demonstration impact members' physical and mental health outcomes?	3-1: Percentage of members who reported a rating of overall health as very good or excellent	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	<ul style="list-style-type: none"> <li>- Chi-square</li> <li>- Comparison of means</li> </ul>
	3-2: Percentage of members who reported a rating of overall mental or emotional health as very good or excellent	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	<ul style="list-style-type: none"> <li>- Chi-square</li> <li>- Comparison of means</li> </ul>
	3-3: Percentage of members who reported a rating of life satisfaction as "Satisfied" or "Very Satisfied"	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	<ul style="list-style-type: none"> <li>- Chi-square</li> <li>- Comparison of means</li> </ul>
	3-4: Percentage of members who reported "Always" or "Usually" feeling stressed or anxious	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	Beneficiary survey	<ul style="list-style-type: none"> <li>- Chi-square</li> <li>- Comparison of means</li> </ul>
	3-5: Percentage of births with low birth weight	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	<ul style="list-style-type: none"> <li>- State eligibility and enrollment data</li> <li>- Vital records</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-test/post-test</li> <li>- ITS</li> </ul>

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Research Question 3.2:</b> How does the H2O demonstration impact members' management of chronic conditions?	3-6: Percentage of members with diabetes with poor hemoglobin control	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS
	3-7: Percentage of members with persistent asthma who had a ratio of controller medications to total asthma medications of at least 50 percent	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS
	3-8: Percentage of members with clinical atherosclerotic cardiovascular disease who received and adhered to statin therapy	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS
<b>Research Question 3.3:</b> How does the H2O demonstration impact rates of mortality among members with SMI?	3-9: All-cause mortality rate among AHCCCS members with SMI	N/A	- State eligibility and enrollment data - Vital records	ITS
	3-10: Maternal mortality rate among AHCCCS members with SMI	N/A	- State eligibility and enrollment data - Medicaid administrative - Vital records	ITS
<b>Research Question 3.4:</b> How does the H2O demonstration impact the quality and effectiveness of downstream services?	3-11: Quality and effectiveness of key downstream services of the H2O program	N/A	- Key informant interviews with care coordinators, case managers, and members - AHCCCS reports	- Qualitative synthesis - Descriptive analysis
<b>Research Question 3.5:</b> How does the H2O demonstration impact disparities in health outcomes?				
<b>Research Question 3.5.1:</b> Does the H2O demonstration improve the physical and mental health outcomes of groups who had poor health outcomes at baseline?	All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data - Contexture race and ethnicity data - Beneficiary survey	Health equity analysis
<b>Research Question 3.5.2:</b> Do any groups experience worsening physical and mental health outcomes compared to the baseline with the implementation of the H2O demonstration?				

Research Question	Measure(s)	Comparison Group(s)	Data Source(s)	Analytic Approach
<b>Hypothesis 4: The H2O demonstration will reduce cost of care for members who utilize H2O services.</b>				
<b>Research Question 4.1:</b> How does the H2O demonstration impact the total cost of care among H2O members compared to members who are eligible but not participating in the H2O demonstration?	4-1: Total cost of care, stratified by the following categories: <ul style="list-style-type: none"> <li>All facility costs</li> <li>IP facility costs</li> <li>Professional services costs</li> <li>Pharmacy costs</li> <li>PH costs</li> <li>BH costs</li> </ul>	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD
	4-2: Total cost of care by key subpopulations (age, sex, sexual orientation, gender identity, race/ethnicity, English language proficiency, primary language, disability status, geography, eligibility category, HRSN domains, high-cost high-needs)	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist	- State eligibility and enrollment data - Claims/encounter data	- Pre-test/post-test - ITS - DiD

Note: ADHS: Arizona Department of Health Services; AHCCCS: Arizona Health Care Cost Containment System; AHP: AHCCCS Housing Program; BARC: Brief Assessment of Recovery Capital; BH: behavioral health; CLRS: closed loop referral system; COC: Continuum of Care; DES: Department of Economic Security; DiD: difference-in-differences; ED: emergency department; FDA: United States Food and Drug Administration; IP: inpatient; ITS: interrupted time series; HCPCS: Healthcare Common Procedure Coding System; HDX: Homelessness Data Exchange; HIC: housing inventory count; HIV: human immunodeficiency virus; HRSN: health-related social needs; HUD: United States Department of Housing and Urban Development; H2O: Housing and Health Opportunities; H2O-PA: H2O Program Administrator; IQ: implementation question; OP: outpatient; OUD: opioid use disorder; PIT: point-in-time count; PCP: primary care provider; PH: physical health; PRAPARE: Protocol for Responding to and Assessing Patients’ Assets Risks, and Experiences; PSH: permanent supportive housing; RBHA: Regional Behavioral Health Agreement; SDOH: social determinants of health; SMI: serious mental illness; SNAP: Supplemental Nutrition Assistance Program; SUD: substance use disorder; WIC: Special Supplemental Nutrition Program for Women, Infants, and Children

## Data Sources

Multiple data sources will be used to evaluate the H2O program:

- Administrative data
- State beneficiary surveys
- Key informant interviews
- Additional data sources

### Administrative Data

Administrative data extracted from the Pre-paid Medical Management Information System (PMMIS) will be used to calculate most measures proposed in this evaluation design. These data include administrative claims/encounter data, member eligibility, enrollment, and demographic data. Provider data will also be utilized as necessary to identify provider type and member attribution.



Use of fee-for-service (FFS) claims, and managed care encounters will be limited to final, paid status claims/encounters. Interim transaction and voided records will be excluded from all evaluations because these types of records introduce a level of uncertainty (from matching adjustments and third-party liabilities to the index claims) that can impact reported rates and cost calculations.

### **State Beneficiary Surveys**

State beneficiary surveys will be used to assess members' satisfaction and experience with healthcare, and self-reported inability to pay mortgage, rent or utility. Consumer Assessment of Healthcare Providers and Systems (CAHPS®)<sup>3-1</sup> surveys are often used to assess satisfaction with provided healthcare services and are adapted to elicit information addressing the research hypotheses related to members' continuity of healthcare coverage, and overall health status and utilization. Beneficiary surveys will adapt existing CAHPS questions to assess ratings of overall health and overall mental or emotional health. Additional questions to assess housing and utility insecurity and use of emergency shelters will be adapted from the Behavioral Health Risk Factor Surveillance System (BRFSS) Social Determinants and Health Equity Module:

- MSDHE.01—In general, how satisfied are you with your life?
- MSDHE.07—During the last 12 months, was there a time when you were not able to pay your mortgage, rent or utility bills?
- MSDHE.08—During the last 12 months was there a time when an electric, gas, oil, or water company threatened to shut off services?
- MSDHE.10—Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because their mind is troubled all the time. Within the last 30 days, how often have you felt this kind of stress?

Results will be compared against national benchmarks for measures in which survey questions share identical language. The sampling frame for the survey will be identified through eligibility and enrollment data, with specific enrollment requirements being finalized upon inspection of the data. Typically, members are drawn from those enrolled continuously during the last six months of the measurement period, with no more than a one-month gap in enrollment.

To the extent possible, the independent evaluator will align multiple surveys to be distributed at the same time to increase response rates across all programs with overlapping populations. A range of sampling protocols will be considered including simple random samples; stratified random samples; multistage stratifications (i.e., cluster); and targeted oversamples.

Measures utilizing the beneficiary surveys will be based on standardized CAHPS and BRFSS questions, however unlike traditional CAHPS surveys, the beneficiary survey will not require that members are enrolled for at least five of the past six months. Instead, the sampling frame will be adjusted to include a sample of members who have been enrolled within the past month to capture those who have newly enrolled into Medicaid and subsequently H2O. All members in the intervention and comparison groups will be eligible to be surveyed. Adult members in the H2O and comparison groups will be randomly sampled to provide a statistically valid estimate. The estimate will provide sufficient statistical power to detect a difference in a rate of at least 10 percentage

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<sup>3-1</sup> CAHPS® is a registered trademark of the Agency for Healthcare Research and Quality (AHRQ).

points with 95 percent confidence and 80 percent power. Assuming a response rate of approximately 15 percent with a 10 percent oversample, the maximum number of surveys to be sent is 2,845.

It is expected that two rounds of cross-sectional surveys will be conducted: once during 2025 and once during 2027. Since these surveys will be conducted following the implementation of the H2O program, historical data for these questions will not be available during the baseline period. As such, this survey will not allow for causal inferences to be drawn regarding the impact of the H2O program. The survey results will provide a comparison of the intervention group relative to the comparison group across two time points in the evaluation period. Because evaluations for several concurrent programs are planned, the State and its independent evaluator will seek to streamline survey administration across evaluations to minimize the number of separate survey rounds required, thereby minimizing the burden on members, and maximizing the response rate. Therefore, the sampling strategy described above may be revised based on enrollment across waivers. To maximize response rates, a mixed-mode methodology (e.g., mail and web-based) for survey data collection will be used. The addition of email reminders, when data are available, or pre-notification letters to members has been shown to increase response rates and will be incorporated into survey administration.

Lastly, the questions assessing housing insecurity, such as “During the last 12 months, was there a time when you were not able to pay your mortgage, rent or utility bills?” may be added to the statewide CAHPS survey. As such, it may be possible to identify housing insecurity across all AHCCCS populations and the independent evaluator will explore methods to incorporate this information within the evaluation reports. As these populations may fall outside the scope of the target population for this evaluation, this component will not be included as part of the formal evaluation of the H2O program’s impact.

### Key Informant Interviews

To better understand the implementation of H2O and provide context for progress toward meeting the Waiver’s goals, the State will administer key informant interviews with stakeholders and entities including the H2O-Program Administrator (H2O-PA), H2O providers, member health homes, and community-based organizations (CBOs). Interview questions will be adapted from the implementation questions recommended in the Center for Medicare & Medicaid Services’ (CMS’) technical guidance for health-related social needs (HRSN) demonstrations. The exact wording of the questions may change during the key informant interviews.

Table 3-4 lists the implementation questions that will be assessed. Key informant interviews will be conducted through a semi-structured interview protocol, transcribed, and imported into MAXQDA where the data will be coded to permit qualitative analysis. The transcripts, coding methodologies, and coded data will be used to answer the appropriate research questions and provide background on the implementation of the H2O program.

**Table 3-4—Implementation Questions**

HRSN Implementation Questions	
1	Which key entities are collaborating to implement and operationalize the demonstration, and what are their main roles? How and why have the roles or participation of those key entities changed during the demonstration?
2	What are barriers for key entities implementing the demonstration, and what strategies have key entities used to overcome barriers? What are facilitators for key entities implementing the demonstration? What suggestions do key entities have for improving the demonstration?
3	What facilitators and barriers to participation do members experience, and what does this information suggest about the need for refinements to member and provider outreach as well as demonstration implementation or design more broadly?

HRSN Implementation Questions	
4	What strategies and tools do key entities use to identify members with social risk factors and facilitate member participation in the demonstration? How, if at all, and why have key entities adapted these strategies? What did the state learn about promising practices for identifying and engaging members?
5	How are key entities implementing HRSN case management and providing HRSN services through the demonstration? What did the state learn about promising practices for delivering services to address members' HRSNs?
5a	How, if at all, did the demonstration establish a process to share and receive screening results among key entities? How, if at all, have healthcare providers modified their clinical practice in response to this information?
5b	How do key entities form and maintain organizational partnerships to promote integration of health and HRSN services?
5c	To what extent is the state integrating the demonstration with its existing programs and infrastructure? What did the state learn about promising practices to support this integration?
6	What infrastructure are key entities developing or acquiring using demonstration funds? What did the state learn about promising practices to build infrastructure to support HRSN screening, case management, and service delivery?
7	How is the local availability of and investment in social services outside of the demonstration (such as housing supports) changing during the demonstration? (Research Question 1.2)

## Additional Data Sources

### ADHS

Vital records data from the Arizona Department of Health Services (ADHS) will be used to calculate measures pertaining to low birth weight, all-cause mortality, and maternal mortality. In addition, race and ethnicity data from the ADHS vital records data may be used to supplement the demographic data provided in enrollment data from AHCCCS.

### ADHS and DES SNAP and WIC

Enrollment and eligibility data relating to the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) collected from ADHS and the Department of Economic Security (DES) will be used to calculate Measure 1-18, which refers to the percentage of members enrolled in SNAP/WIC.

### AHCCCS Reports

Data from the Maintenance of Effort (MOE) report provided by AHCCCS will be utilized to determine changes in state/local investments in social services related to housing transition supports. In addition, data relating to downstream services and or State/local investments in social services will be utilized as available to provide context alongside key informant interview responses.

### AHP Waitlists

The independent evaluator will work with AHCCCS to obtain AHP waitlists at regular intervals. This data will be utilized to identify a potential comparison group of members who are eligible for H2O but have not yet participated in the program.

## BRFSS

BRFSS is a health-focused telephone survey developed by the Centers for Disease Control and Prevention (CDC) that collects data from approximately 400,000 adults annually across all 50 states, Washington D.C., and three territories.<sup>3-2</sup> The questionnaire generally consists of two components: a core component and an optional component. Optional components are chosen by the individual state and can vary year to year. In 2020, Arizona elected to include the Social Determinants and Health Equity module on their BRFSS questionnaire, which included questions to assess a broad range of social, structural, and contextual experiences that impact health. It is unknown if Arizona will continue to include the optional Social Determinants and Health Equity model in future BRFSS surveys, but should the State elect to include this module in future evaluation years, those results may be used to provide additional context. As the H2O beneficiary survey questions will mimic several BRFSS questions (listed under the State Beneficiary Surveys section), statewide rates may serve as a reference to provide context to the beneficiary survey results, but will not serve as a comparison group, as the H2O program is intended to target a much more specific population than the overall Medicaid population captured by BRFSS.

## CLRS

Data from the statewide closed-loop referral system (CLRS), CommunityCares will be used to assess whether members with unmet health-related social needs (HRSNs) are receiving referrals to community services. Data may also be used to confirm if the referral was received by the community-based organization.

The Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences (PRAPARE) screening tool is the default tool within the CLRS. Providers may use the PRAPARE tool or any HRSN screening tool as long as it covers homelessness/housing instability, food insecurity, transportation assistance, employment instability, utility assistance, interpersonal safety, justice/legal involvement, and social isolation/social support.<sup>3-3</sup> The independent evaluator will work with AHCCCS to obtain data from the PRAPARE screening tool or other AHCCCS-approved HRSN assessment tools to assess members who have been screened for an HRSN and had a need identified.

## Contexture

Data provided from Arizona's health information exchange (HIE), Contexture, may be used to supplement race and/or ethnicity data provided in AHCCCS' enrollment data.

## HUD HDX HIC and PIT

The United States Department of Housing and Urban Development (HUD) Homelessness Data Exchange (HDX) maintains a data platform that tracks point-in-time (PIT) counts of sheltered and unsheltered people experiencing homelessness on a single night in January of each year.<sup>3-4</sup> The Housing Inventory Count (HIC) is a point-in-time inventory of provider programs within a Continuum of Care (CoC) that provide beds and units to serve people

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<sup>3-2</sup> Centers for Disease Control and Prevention. About BRFSS. Available at: <https://www.cdc.gov/brfss/about/index.htm>. Accessed on: Dec 20, 2023.

<sup>3-3</sup> Arizona Health Care Cost Containment System. Protocol for Assessment of Beneficiary Eligibility and Needs, Infrastructure Planning, and Provider Qualifications for H2O Services. Available at: <https://www.azahcccs.gov/Resources/Downloads/HousingWaiverRequest/FINALH2OProtocol.pdf>. Accessed on: Dec 20, 2023.

<sup>3-4</sup> HUD Exchange. Point-in-Time Count and Housing Inventory Count. Available at: <https://www.hudexchange.info/programs/hdx/pit-hic/#2024-pit-count-and-hic-guidance-and-training>. Accessed on: Dec 5, 2023.

experiencing homelessness. The HIC is categorized by five program types: Emergency Shelter, Transitional Housing, Rapid Re-Housing, Safe Haven, and Permanent Supportive Housing (PSH). Aggregate data from the HUD HDX will be used to assess how H2O has impacted statewide use of HRSN services reflecting crisis events, such as stays in emergency homeless shelters.

### **Deliverable Submitted to AHCCCS by the H2O-PA**

AHCCCS will utilize a third-party, known as the H2O-Program Administrator (H2O-PA), to facilitate housing administrative functions and data collection. Specifically, the H2O-PA will verify member eligibility for H2O services and monitor and track H2O service utilization data.<sup>3-5</sup> This data will be submitted to AHCCCS by the H2O-PA. It is anticipated that member-level data provided by the H2O-PA will include member identifiers to link H2O participants to AHCCCS administrative data.

### **Supplemental Data from AHCCCS**

Data from Accountable Care Organizations (ACOs) and Clinically Integrated Networks (CINs) provided by AHCCCS may be utilized, where appropriate, for further context regarding patient screenings, referral lists, and connecting patients to services.

## **Analytic Methods**

Multiple analytic techniques were used depending on the type of data and the availability of the data.

### ***Chi Square Analysis***

A Chi-square test of independence allows for comparison between two groups that have a categorical outcome, such as survey results, to determine if there is an association between the two variables. A chi-square test statistic is calculated that compares the observed counts to the expected counts under a null hypothesis of independence between the two variables. The test statistic is compared to a critical value from a chi-square distribution for a given degree of freedom and a p-value is obtained.

### ***Comparison of Means***

A comparison of means will be used to compare the means between two groups for continuous outcomes to determine if the two groups are different from one another. Two sample t-tests or analysis of variance (ANOVA) for multiple comparison will be considered.

### ***Descriptive Time Series***

Measures for the H2O program will rely on program data critical to determining the success of the program on both immediate outcomes, such as the percentage of members receiving an H2O service, the percentage of members who had an HRSN identified from a screening assessment, as well as long-term outcomes like housing retention or change in income through access to benefits or employment. The evaluation of these measures in

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<sup>3-5</sup> Arizona Health Care Cost Containment System. AHCCCS Housing and Health Opportunities Implementation Plan. Available at: [https://azahcccs.gov/Resources/Downloads/HousingWaiverRequest/H2O\\_ImplementationPlan.pdf](https://azahcccs.gov/Resources/Downloads/HousingWaiverRequest/H2O_ImplementationPlan.pdf). Accessed on: Jan 10, 2024.

which there are insufficient data points for a robust ITS analysis, or no viable comparison group for DiD testing, will center on a descriptive analysis of data from various sources such as the closed-loop referral system and H2O provider reporting.

## DiD

The DiD approach will compare the changes in outcome rates between the baseline period and the evaluation period, across the intervention and comparison groups. For the DiD analysis to be valid, the comparison group must accurately represent the change in outcomes that would have been experienced by the intervention group in the absence of the program. The DiD analysis will be conducted with member-level rates, using a logistic regression model for measures with binary outcomes.

The logistic regression form of the DiD model is:

$$\ln \left( \frac{Y_{it}}{1 - Y_{it}} \right) = \beta_0 + \beta_1 T + \beta_2 post + \beta_3 (post \times T) + \gamma \mathbf{D}'_{it} + \varepsilon$$

where  $Y$  is the probability of an outcome for group  $i$  in year  $t$ ,  $T$  is a binary indicator of the intervention group,  $post$  is a binary indicator for the evaluation period, the vector  $\mathbf{D}'$  represents any observed confounding variables that may account for differences between the intervention and comparison groups (described in additional detail below),  $\gamma$  is a coefficient vector, and  $\varepsilon$  is an error term. The intercept  $\beta_0$  represents the log-odds of the outcome for the comparison group during the baseline. The coefficient  $\beta_1$  identifies the difference in log-odds of the outcome between the groups during the baseline period prior to the implementation of the Waiver. The coefficient  $\beta_2$  captures the change in log-odds of the outcome between the baseline and evaluation time periods for the non-intervention group. The coefficient on the interaction term  $\beta_3$  represents the DiD estimate of interest in this evaluation. In other words, it is the difference in the change in log-odds of the outcome between the baseline and evaluation time periods for the intervention group, compared to the change in log-odds of the outcome between the baseline and evaluation time period for the non-intervention group.

Where feasible, DiD analyses utilizing member-level data will include adjustment for demographic characteristics such as age, sex, sexual orientation, gender identity, race/ethnicity, and geography, as well as additional possible confounders such as CDPS risk score, dual eligibility status, duration of Medicaid enrollment, etc.

The DiD approach will be used where possible, as it controls for any factors external to the program that are applied equally to both groups, such as the COVID-19 PHE. However, the method is still susceptible to external factors that may have differentially impacted one group and not the other. If sufficient pre-intervention data are available, it is possible to test if external factors are applied equally to the intervention and comparison groups by visually verifying that both groups exhibit parallel trends in the baseline period. In the absence of treatment, the intervention and comparison groups used in DiD should experience similar changes, manifested as parallel lines during the baseline period. If the parallel trend assumption does not hold, the two-period DiD may still be useful as data during the baseline and evaluation periods will be aggregated into a single pre-intervention and post-intervention average, respectively. Furthermore, the DiD model proposed estimates a single average treatment effect, under the assumption that any heterogeneity in the treatment effect is due to random variation. This assumption is explicit in the model set-up as the DiD treatment effect is represented by a single coefficient ( $\beta_3$ ), and therefore any heterogeneity in treatment effects between individuals cannot be modeled. The independent evaluator recognizes the limitations of this approach and will therefore consider estimating additional models such as panel data models, fixed and random effects models, or hierarchical models. Results from adjusted models will be presented and interpreted keeping in mind the limitations of each approach.

## Propensity Score Methods

For measures in which a comparison group of members is viable and a DiD approach is planned, propensity score matching may be employed to construct the most appropriate comparison group for the H2O population. A logistic regression model will be used to predict the probability that each member participates in the H2O program, conditional on their observed baseline characteristics (i.e., the propensity score). These characteristics will include variables that impact an individual's participation such as sex, age, race/ethnicity, geography, a CDPS risk score, etc.

If the sample size of the propensity-score matched comparison group is too small, then inverse probability of treatment weight (IPTW) using the propensity score may be considered to create weights based on the propensity score and create a sample in which the distribution of baseline covariates is independent of treatment assignment.<sup>3-6</sup>

## ITS

When a suitable comparison group cannot be found and data can be collected at multiple points in time before and after the implementation of the program, an ITS methodology can be used. This analysis is quasi-experimental in design and will compare a trend in outcomes between the baseline period and the evaluation period for those who were subject to the program.

In ITS, the measurements taken before a demonstration was initiated are used to predict the outcome if the demonstration did not occur. The measurements collected after the demonstration are then compared to the predicted outcome to evaluate the impact the demonstration had on the outcome. The generic ITS model is:

$$Y_t = \beta_0 + \beta_1 \text{time} + \beta_2 \text{post} + \beta_3 \text{time} \times \text{post} + \gamma \mathbf{D}'_{it} + \varepsilon$$

where  $Y_t$  is the outcome of interest for the time period  $t$ ,  $\text{time}$  represents a linear time trend,  $\text{post}$  is a dummy variable to indicate the time periods post-implementation,  $\text{time} \times \text{post}$  is the interaction term between time and post, the vector  $\mathbf{D}'$  represents any observed confounding variables that may account for differences between the intervention and comparison groups, and  $\gamma$  is a coefficient vector. The intercept,  $\beta_0$ , identifies the average outcome  $Y$  at the beginning of the data series,  $\beta_1$  is the slope of the outcome between the measurements before the program,  $\beta_2$  is the change in the outcome when the program began,  $\beta_3$  is the change in the slope for the measurements after the program, and  $\varepsilon$  is the error term.

Assuming that the measurements taken after the implementation of the Waiver would have been equal to the expectation predicted from the measurements taken before the Waiver in the absence of the intervention, any changes in the observed rates after implementation can be attributed to the program. However, as the ITS approach relies on a pre- and post-period, it is unable to differentiate between mechanisms that may have impacted observed changes; it is possible that external events could have occurred simultaneously with the Waiver and influenced the outcomes of interest. The independent evaluator will rely on best practices to mitigate the potentially confounding effect of simultaneously occurring confounding events such as the COVID-19 PHE as well as post-pandemic Medicaid "unwinding" by including the use of dummy variables for each time period. To

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<sup>3-6</sup> Austin, P. An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies US National Library of Medicine National Institutes of Health, Multivariate Behavioral Health Research. 2011 May; 46(3): 399-424. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3144483/>. Accessed on: Apr 9, 2024.

account for the impact of the COVID-19 PHE, ITS models will incorporate dummy variables to adjust for the confounding effects if sufficient data is available. An indicator variable for quarter 2 (Q2) 2020 will represent the initial wave of the COVID-19 PHE-related shutdowns and stay-at-home orders, and a separate indicator variable for Q3 2020 through the end of Q1 2021 will reflect subsequent Arizona-specific public health orders. For measures calculated annually, an indicator variable for 2020 will be included in the model to adjust for the COVID-19 PHE. Furthermore, the independent evaluator will consider several sensitivity analyses to test the robustness of the main model results. As the Waiver overlaps with the COVID-19 PHE as well as post-pandemic Medicaid “unwinding”, the independent evaluator will explore how the results change when excluding the years most impacted by these external events, or when estimating program effects separately by each year, rather than aggregating baseline years and evaluation years. A similar approach will be taken to account for the “unwinding” period in which the Medicaid continuous enrollment condition authorized ended and AHCCCS began redeterminations of eligibility.

A second assumption of the proposed ITS model is that a linear model can appropriately characterize the relationship between independent variables and the response variable. The independent evaluator will test this assumption by examining error autocorrelation; if subsequent error terms are highly correlated, then parameter estimates and variance obtained from the model may be biased, resulting in misleading conclusions. During analyses, the independent evaluator will take steps to test for autocorrelation and assess the model fit. If the linear model is a poor fit for the data, additional procedures will be explored such as transformation of the model to remove autocorrelation or estimating an autoregressive model.

A limitation of ITS is the need for sufficient data points both before and after program implementation.<sup>3-7, 3-8, 3-9</sup> To facilitate this methodology, the independent evaluator may consider additional baseline data points using prior year calculations, and/or calculating quarterly rates where feasible, if multiple years both pre-and post-implementation are available to control for seasonality.

For measures where DiD and ITS approaches are listed, a DiD or comparative approach will be utilized if there are sufficient pre-implementation and post-implementation data points for both the intervention and comparison groups and the sample size is sufficient to construct a comparison group. For measures in which there are many pre-implementation and post-implementation data points for both intervention and comparison groups, a comparative ITS will be utilized. For measures in which few data points either pre-implementation or post-implementation are available for both groups, a DiD will be utilized. In cases where the data does not meet these criteria, a single group ITS approach will be utilized.

## Health Equity Analysis

To address research questions focused on exploring the impact that the H2O demonstration has on health disparities in HRSN, a health equity analysis will be conducted. A detailed assessment of changes in health disparities across time will be the primary analytic approach for assessing health equity. Outcome measures for

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- <sup>3-7</sup> Baicker, K., and Svoronos, T., (2019) “Testing the Validity of the Single ITS Design,” NBER Working Paper 26080. Available at: <https://www.nber.org/papers/w26080.pdf>. Accessed on: Dec 1, 2023
- <sup>3-8</sup> Bernal, J.L., Cummins, S., Gasparrini, A. (2017) “Interrupted time series regression for the evaluation of public health interventions: a tutorial,” *International Journal of Epidemiology*, 46(1): 348-355. Available at: <https://doi.org/10.1093/ije/dyw098>. Accessed on: Dec 1, 2023
- <sup>3-9</sup> Penfold, R. B., Zhang, F. (2013) “Use of Interrupted Time Series Analysis in Evaluating Health Care Quality Improvements,” *Academic Pediatrics*, 13(6): S38 - S44. Available at: <https://doi.org/10.1016/j.acap.2013.08.002>. Accessed on: Dec 1, 2023.



relevant demographic subgroups (e.g., age, sex, sexual orientation, gender identity, race/ethnicity, geography, disability status, primary language, eligibility group, high-cost high-needs, etc.) will be compared to a reference group and assessed for statistically significant differences as well as clinically meaningful differences in relative percentages and effect sizes. A two-tailed t-test will be conducted to determine the statistical significance between the reference and comparison groups. Clinically meaningful outcomes will be assessed through effect sizes and relative percentage point differences between the groups of interest.

Cohen's  $h$  will be utilized to determine the effect size between comparison and reference group rates. Effect sizes can fall into small, medium, or large categories.<sup>3-10</sup> This method is applicable to measures where the rate is bound between 0 and 1. The formula for Cohen's  $h$  is given by:

$$h = (2 * \arcsin\sqrt{P_1}) - (2 * \arcsin\sqrt{P_2})$$

where  $P_1$  is the annual rate for the comparison group and  $P_2$  is the annual rate for the reference group.

For measures where the rates are not bound between 0 and 1, the relative percent difference between each demographic stratification and reference category will be calculated by subtracting the reference group rate from the comparison group rate, then dividing by the reference group rate.

Rates will be compared across reference and comparison demographic groups where data is available, accurate, and relevant for measures with data supporting a health equity analysis. The independent evaluator may limit reporting to groups with either statistically significant or clinically meaningful differences, with the full results presented in the appendix. Demographic data is anticipated to be available for age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains. The independent evaluator will work with the State to develop a method for identifying and reporting results by additional stratifications, such as disability status and high-cost high needs. The measure specifications in Appendix D identify the demographic stratification groups for each measure, based on the anticipated available demographic data fields. Rates involving numerators smaller than five members and denominators smaller than 30 members will be suppressed due to potentially unreliable rate calculation and to ensure anonymity.

### **Pre-test/post-test**

For measures with consistent specifications over time for which national or regional benchmarks are not available, and which have too few observations to support an ITS analysis, rates will be calculated and compared both before and after program integration.<sup>3-11</sup> As the rates pre- and post- implementation may represent a slightly different group of Medicaid members over time (due to churn of individuals enrolling and dis-enrolling from Medicaid), statistical testing will be conducted through a Chi-square analysis. Additional information can be found in the Chi-Square Analysis section.

### **Repeated Cross-Sectional Design**

A repeated cross-sectional design will be employed for measures in which the same group of individuals cannot be tracked longitudinally across time, such as measures related to mortality rate. Measures employing this design

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<sup>3-10</sup> Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd Ed. Hillsdale, N.J.: L. Erlbaum Associates; 1988:25

<sup>3-11</sup> Because measures are calculated on an annual reporting period, the post-implementation period during the current demonstration approval period of three years is insufficient to support an ITS analysis.

will be calculated at various points in time across the entire study period but will represent a different sample or “cross-section” of the population at each time point. For instance, if pre-implementation data is not available for Measures 1-10, 1-11, and 1-12, the independent evaluator will assess rates of screening and positive identification of HRSN among H2O members at intake and regular frequencies thereafter to assess changes in screening severities (semi-annually, annually). At the time of developing this evaluation design, screening data is only available for AHCCCS members participating in H2O. If screening data for the broader AHCCCS population becomes available, the independent evaluator will explore calculating screening measures with the total AHCCCS population as a comparison group.

Measure 1-18 relating to SNAP/WIC enrollment among members will utilize a repeated cross-sectional design and compare H2O members to comparison group members at the start of the H2O program and at regular intervals thereafter.

### Cost Analysis

The cost analysis is designed to analyze the differences between total costs for the H2O population compared to the comparison group of H2O eligible individuals who have not participated in the program or members on the AHP housing waitlist. Note that the cost analyses do not refer to or attempt to replicate the formal Budget Neutrality test required for Section 1115 Demonstration Waivers, which sets a fixed target under which Waiver expenditures must fall that was set at the time the Waiver was approved.

Cost of care for H2O members based on the H2O HRSN Medicaid Expenditure Group (MEG) will be calculated for each member in each month. Similarly, costs of care for comparison group members will also be calculated for each member monthly. To identify the source of treatment cost drivers for members, total costs will be stratified by the categories of service presented in

Table 3-5 as well as further divided into PH and BH costs. Data will be aggregated across both intervention and comparison group members in order to calculate per-member per-month (PMPM) costs for each month pre- and post-implementation of the H2O program.<sup>3-12</sup> DiD or comparative ITS models with adjustment for seasonal effects and other potential confounders will be conducted for total cost of care, as well as for each level of cost stratification mentioned above.

**Table 3-5—Categories of Service**

Categories of Service
IP
OP (ED and Non-ED)
LTC
Professional
Pharmacy

Note: ED: emergency department; IP: Inpatient; LTC: long-term care; OP: outpatient

<sup>3-12</sup> CMS guidance describes constructing an ITS with member-level controls. However, due to a low prevalence of costs for most members—especially when stratified by category of service—robust statistical analysis at the member-level may not be feasible. CMS guidance references literature on evaluating healthcare expenditures using a two-part model as one mechanism to account for this issue; however, the method described in the literature is not applied in an ITS framework, which relies on assessing trends in costs. Given the frequency of months in which members will not incur any costs and the unbalanced nature of the panel dataset, member-level trends may not be reliably estimated.

## **Descriptive Analysis**

Descriptive analyses will be utilized when reviewing supplemental documentation from AHCCCS, including, but not limited to, MOE reports and data on downstream services provided to H2O members. This approach may include comparing the availability of services and budget changes annually, depending on data availability.

## **Qualitative Synthesis**

To evaluate the implementation questions and Research Questions 1-2 and 3-4, key informant interviews with key stakeholders will be conducted. A qualitative synthesis will be utilized to evaluate the H2O demonstration.

Key informant interviewees will be recruited from nominees identified by AHCCCS. These interviewees may include health home staff, care coordinators, or case managers. Interviews will invite input from representatives of the H2O program and appropriate individuals identified by AHCCCS as having experience and subject matter expertise regarding the development and implementation of strategies regarding downstream services and State and local housing supports.

AHCCCS will be asked to provide the names of individuals from pertinent organizations most familiar with the implementation activities performed by the State, including AHCCCS. Each of these individuals will be requested to participate in a 60 to 90-minute interview session to provide insights into the implementation of the Waiver. A limited number of key informant interviews should be sufficient because there will be a limited number of staff at the agency with a working knowledge of the activities associated with the Waiver, and the challenges and successes that accompanied the implementation.

A flexible protocol will be developed for the key informant interviews to be conducted with a sample of subjects with knowledge of the specific strategies developed and implemented as a result of the Waiver, the barriers encountered during the implementation, and members' connection to broader services, including downstream services and State and local housing supports. Interview questions will be developed to seek information about the plans' strategies to service delivery and care integration activities as well as any barriers encountered, including:

- Organizational structures and operational systems.
- Program design and implementation.
- Member engagement and communication.
- Broader waiver context, including State and local funding and service provision.

Early interviews will inform the development and choice of topics and help inform the selection of additional interview subjects to round out the list of individuals to be interviewed for this project. In both formats, open-ended questions will be used to maximize the diversity and richness of responses and ensure a more holistic understanding of the subject's experience. Probing follow-up questions will be used as appropriate to elicit additional detail and understanding of critical points, terminology, and perspectives. The sessions will be recorded and transcribed with participant consent.

The information obtained from these interviews will be synthesized with the results from other quantitative data analyses providing an in-depth discussion of each of the domains/objectives to be considered. As the key informant interviews are being conducted, the independent evaluator will perform ongoing and iterative review of the interview responses and notes to identify overall themes and common response patterns. Unique responses that are substantively interesting and informative will also be noted and may be used to develop probing questions

for future interviews. The results of these preliminary analyses will be used to document the emergent and overarching themes related to each research question. The documentation of emergent themes will be reviewed iteratively to determine if responses to interview questions are continuing to provide new perspectives and answers, or if the responses are converging on a common set of response patterns indicating saturation on a particular interview question. As additional interview data are collected, the categories, themes, and relationships will be adjusted to reflect the broader set of concepts and different types of relationships identified. The documentation of emergent themes will also be used as an initial starting point for organizing the analysis of the interview data once all interviews are completed.

Following the completion of the key informant interviews, the interview notes and transcripts will be reviewed using standard qualitative analysis techniques. The data will first be examined through open coding to identify key concepts and themes that may not have been captured as emergent themes during previous analyses. After identifying key concepts, axial coding techniques will be used to develop a more complete understanding of the relationships among categories identified by respondents in the data. The open and axial coding will be performed with a focus on identifying the dimensionality and breadth of responses to the research questions posed for the overall project. Interviewee responses will be identified through the analysis to illustrate and contextualize the conclusions drawn from the research and will be used to support the development of the final report.

## Disentangling Confounding Events

Factors outside of the H2O program, such as other programs and initiatives that target the same population, may influence outcomes studied. The Targeted Investments (TI) 2.0 program seeks to extend the original TI program and emphasizes AHCCCS' goal of improving quality and health equity through comprehensively addressing HRSN and providing whole person care. The TI 2.0 program began October 1, 2022, with two years of onboarding and establishment of new systems and processes. Implementation and evaluation of system processes will occur from October 1, 2024, through September 30, 2027. As this implementation coincides with the start of the H2O program, there is a possibility for confounding effects of the TI 2.0 program to impact the evaluation of the H2O program. There is a strong potential for overlap between the H2O population and TI 2.0 populations as the TI 2.0 program justice component specifically targets individuals transitioning from the criminal justice system. It is possible that some TI 2.0 activities related to focus areas of identifying the HRSN needs of the patient populations and coordinating early reach-in activities may have a confounding impact on H2O outcomes. Similar to the plans to mitigate the potential confounding effects of the COVID-19 PHE described in the Analytic Methods subsection, the independent evaluation will follow best practices to address the confounding impact of the TI 2.0 program. The independent evaluator will collaborate with AHCCCS and the independent evaluator of the TI 2.0 program to identify a list of members participating in the TI 2.0 program each year. These member-years will be flagged, and statistical controls utilized to assess the effect of H2O program net of the TI 2.0 program.

The COVID-19 PHE widely impacted the healthcare system and socioeconomic conditions more broadly beginning in approximately March 2020 with the COVID-19 PHE ending in May 2023.<sup>3-13</sup> The COVID-19 PHE has already exerted an arguably substantial force on the State of Arizona, its healthcare system, and its Medicaid population. Increases in Medicaid enrollment during the COVID-19 PHE are tied to substantial shifts in the disease conditions and comorbidities of the Medicaid population and may impact aggregate spending by

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<sup>3-13</sup> Centers for Disease Control and Prevention. End of the Federal COVID-19 Public Health Emergency (PHE) Declaration. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/your-health/end-of-phe.html>. Accessed on: Dec 1, 2023.

AHCCCS. Social distancing efforts and stay-at-home orders interrupted routine care visits and effectively reduced the demand for many healthcare services to near zero. In an ideal evaluation, the independent evaluator would be able to control for many of these issues during the analysis. The ability to do so in the current context of the Waiver evaluation will depend on the availability of data and control variables.

Methods that allow for the disentanglement of AHCCCS program impacts from results driven by COVID-19 or the policy response within Arizona and other states have been described further in the Analytic Methods subsection.

## 4. Methodological Limitations

There are several key limitations to the evaluation of the Housing and Health Opportunities (H2O) program. The primary limitation is the selection of a suitable comparison group for H2O participating members. The most appropriate comparison group for H2O members would be Medicaid members with similar demographic and health characteristics, who did not enroll in the H2O program. The proposed comparison group of H2O eligible members who did not enroll in the program or who are on the Arizona Health Care Cost Containment System (AHCCCS) Housing Program (AHP) housing waitlist is a close approximation for the ideal comparison group. However, to the extent that individuals are selected into the program and prioritized off of the housing waitlist based on severity of serious mental illness (SMI), chronic health conditions or housing need, it is possible that a difference in need persists across H2O members and comparison group members that could therefore impact the results. However, use of propensity-score matching methods that are meant to account for inherent differences in the groups may limit the impact of this bias.

A second limitation relates to the health equity analysis. The independent evaluator recognizes that health equity is a complex subject and that there have been many significant discussions around the topic of measuring health equity among the broader scientific community. There is no single approach to evaluating health equity that is without limitations and thus, this evaluation utilizes multiple methods to address health equity related research questions. The proposed health equity analysis is designed to provide an overview of how health disparities have changed during the H2O study period but acknowledges the primary limitation that any changes in disparities identified cannot be causally attributed to the H2O program, as co-occurring external factors may impact the measured outcomes. Finally, the availability of stratifications will vary by year and data source. AHCCCS plans to improve data collection for race/ethnicity, sexual orientation, and gender identity over the course of the evaluation period. The independent evaluator will stratify results by key fields where data is available and accurate.

## Appendix A. Independent Evaluator

The Arizona Health Care Cost Containment System (AHCCCS) will select an independent evaluator with experience and expertise to conduct a scientific and rigorous Medicaid Section 1115 waiver evaluation meeting all the requirements specified in the Special Terms and Conditions (STCs). The independent evaluator will be required to have the following qualifications:

- Knowledge of public health programs and policy.
- Experience in healthcare research and evaluation.
- Understanding of AHCCCS programs and populations.
- Expertise with conducting complex program evaluations.
- Relevant work experience.
- Skills in data management and analytic capacity.
- Medicaid experience and technical knowledge.

Based on State protocols, AHCCCS will follow established policies and procedures to acquire an independent entity or entities to conduct the waiver evaluation. In addition, AHCCCS will ensure that the selected independent evaluator does not have any conflicts of interest and will require the independent evaluator to sign a “No Conflict of Interest” statement.

## Appendix B. Evaluation Budget

Due to the complexity and resource requirements of Arizona’s Section 1115 Arizona Health Care Cost Containment System Demonstration Waiver (the Waiver), AHCCCS will need to conduct a competitive procurement to obtain the services of an independent evaluator to perform the services outlined in this evaluation design. Upon selection of an evaluation vendor, a final budget will be prepared in collaboration with the selected independent evaluator. Table B-1 displays the proposed budget that will be used for submitting total costs for the evaluation of the Housing and Health Opportunities (H2O) program.

**Table B-1—Proposed Budget**

Evaluation Area/Task	SFY 24	SFY 25	SFY 26	SFY 27	SFY 28	SFY 29	SFY 30
<b>Project Administration and Monitoring Reports</b>							
Staff Costs	\$ 12,405	\$ 8,639	\$ 17,046	\$ 25,935	\$ 28,446	\$ 19,452	\$ 3,689
Administrative Costs	\$ 3,278	\$ 3,725	\$ 4,504	\$ 8,552	\$ 7,516	\$ 5,139	\$ 975
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ 15,683</b>	<b>\$ 12,364</b>	<b>\$ 21,550</b>	<b>\$ 34,487</b>	<b>\$ 35,962</b>	<b>\$ 24,591</b>	<b>\$ 4,664</b>
<b>Key Informant Interviews</b>							
<b>Instrument Design</b>							
Staff Costs	\$ -	\$ -	\$ 16,315	\$ 9,025	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 4,310	\$ 2,976	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 20,625</b>	<b>\$ 12,001</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Administration</b>							
Staff Costs	\$ -	\$ -	\$ 21,493	\$ 2,469	\$ 24,599	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 5,679	\$ 814	\$ 6,499	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 27,172</b>	<b>\$ 3,283</b>	<b>\$ 31,098</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Analysis</b>							
Staff Costs	\$ -	\$ -	\$ 10,969	\$ -	\$ 19,874	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 2,898	\$ -	\$ 5,251	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 13,867</b>	<b>\$ -</b>	<b>\$ 25,125</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Provider Focus Groups</b>							
<b>Instrument Design</b>							
Staff Costs	\$ -	\$ -	\$ 10,876	\$ 10,745	\$ 14,123	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 2,874	\$ 3,543	\$ 3,731	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 13,750</b>	<b>\$ 14,288</b>	<b>\$ 17,854</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Administration</b>							
Staff Costs	\$ -	\$ -	\$ 14,328	\$ 2,340	\$ 11,173	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 3,786	\$ 772	\$ 2,952	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 18,114</b>	<b>\$ 3,112</b>	<b>\$ 14,125</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Analysis</b>							
Staff Costs	\$ -	\$ -	\$ 7,164	\$ -	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 1,893	\$ -	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 9,057</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>





Evaluation Area/Task	SFY 24	SFY 25	SFY 26	SFY 27	SFY 28	SFY 29	SFY 30
<b>Member/Beneficiary Surveys</b>							
<b>Instrument Design</b>							
Staff Costs	\$ -	\$ 16,060	\$ -	\$ 18,530	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ 6,924	\$ -	\$ 6,110	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ 22,984</b>	<b>\$ -</b>	<b>\$ 24,640</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Administration</b>							
Staff Costs	\$ -	\$ 16,724	\$ -	\$ 19,305	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ 7,211	\$ -	\$ 6,366	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ 34,799	\$ -	\$ 34,799	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ 58,734</b>	<b>\$ -</b>	<b>\$ 60,470</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Analysis</b>							
Staff Costs	\$ -	\$ -	\$ 7,701	\$ -	\$ 32,023	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 2,035	\$ -	\$ 8,460	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 9,736</b>	<b>\$ -</b>	<b>\$ 40,483</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Measure Calculation and Analysis</b>							
<b>Data Collection/Validation</b>							
Staff Costs	\$ -	\$ -	\$ 27,500	\$ -	\$ 44,504	\$ 48,109	\$ -
Administrative Costs	\$ -	\$ -	\$ 7,265	\$ -	\$ 11,758	\$ 12,711	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 34,765</b>	<b>\$ -</b>	<b>\$ 56,262</b>	<b>\$ 60,820</b>	<b>\$ -</b>
<b>Code Development/Execution</b>							
Staff Costs	\$ -	\$ -	\$ 39,112	\$ -	\$ -	\$ 85,387	\$ -
Administrative Costs	\$ -	\$ -	\$ 10,333	\$ -	\$ -	\$ 22,559	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 49,445</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 107,946</b>	<b>\$ -</b>
<b>Statistical Analysis</b>							
Staff Costs	\$ -	\$ -	\$ 27,536	\$ -	\$ -	\$ 92,985	\$ -
Administrative Costs	\$ -	\$ -	\$ 7,275	\$ -	\$ -	\$ 24,567	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 34,811</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 117,552</b>	<b>\$ -</b>
<b>EHR Measure Calculation and Analysis</b>							
<b>Data Collection/Validation</b>							
Staff Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Code Development/Execution</b>							
Staff Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Reporting</b>							
<b>Interim Evaluation Report</b>							
Staff Costs	\$ -	\$ -	\$ 33,155	\$ 17,136	\$ -	\$ -	\$ -
Administrative Costs	\$ -	\$ -	\$ 8,759	\$ 5,651	\$ -	\$ -	\$ -
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 41,914</b>	<b>\$ 22,787</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Summative Evaluation Report</b>							
Staff Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 117,413	\$ 88,858
Administrative Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 31,021	\$ 23,477
Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Costs</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 148,434</b>	<b>\$ 112,335</b>
<b>Total</b>	<b>\$ 15,683</b>	<b>\$ 94,082</b>	<b>\$ 294,806</b>	<b>\$ 175,068</b>	<b>\$ 220,909</b>	<b>\$ 459,343</b>	<b>\$ 116,999</b>

## Appendix C. Timeline and Major Milestones

The following project timeline, presented in Figure C-1 has been prepared for the Housing and Health Opportunities (H2O) program of the Section 1115 Arizona Health Care Cost Containment System (AHCCCS) Demonstration Waiver (the Waiver). This timeline is preliminary and subject to change based on approval of the evaluation design and implementation of the Waiver programs.

**Figure C-1—Preliminary Project Timeline**

Task	SFY2024				SFY2025				SFY2026				SFY2027				SFY2028				SFY2029
	CY2024				CY2025				CY2026				CY2027				CY2028				CY2029
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
<b>Prepare and Implement Study Design</b>																					
Conduct kick-off meeting																					
Prepare analysis workplan																					
<b>Data Collection</b>																					
Obtain Arizona Medicaid claims/encounters																					
Obtain Arizona Medicaid member, provider, and eligibility/enrollment data																					
Obtain financial data																					
Integrate data; generate analytic dataset																					
Obtain EHR data																					
Integrate EHR data into processes																					
<b>Conduct Analysis</b>																					
<b>Non-Survey Analyses</b>																					
Prepare and calculate metrics																					
Conduct statistical testing and comparison																					
<b>Survey Analyses</b>																					
Develop survey instrument																					
Field survey; collect satisfaction data																					
Conduct survey analyses																					
<b>Reporting</b>																					
Draft Interim Evaluation Report																					
Final Interim Evaluation Report																					
Draft Summative Evaluation Report																					
Final Summative Evaluation Report																					

Note: CY: calendar year; EHR: electronic health record; NCI: National Core Indicators; SFY: state fiscal year; Q: quarter

## Appendix D. Proposed Measure Specifications

The tables in this section provide the detailed measure specifications for the Housing and Health Opportunities (H2O) program of the Section 1115 Arizona Health Care Cost Containment System (AHCCCS) Demonstration Waiver (the Waiver) evaluation.

**Hypothesis 1: The demonstration will meet or reduce the severity of health-related social needs (HRSN) for members overall and among subpopulations who experience disparities in HRSN.**

**Research Question 1.1: How does the H2O demonstration impact the use of HRSN services?**

Percentage of members experiencing homelessness who were contacted (Measure 1-1)	
Numerator/Denominator	Numerator: Number of members in the denominator who were contacted Denominator: Number of members experiencing homelessness
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains <sup>D-1</sup>
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-Program Administrator (H2O-PA)
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

Percentage of members participating in H2O who completed an intake and received a service within seven days of enrollment (Measure 1-2)	
Numerator/Denominator	Numerator: Number of members in the denominator who received a service within seven days of enrollment in H2O Denominator: Number of members participating in H2O who completed an intake
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

<sup>D-1</sup> Stratifications for measures are based on the best available data. The independent evaluator will review the data provided by AHCCCS and work with AHCCCS to identify appropriate and feasible stratifications.

Percentage of members eligible for H2O, who are participating in the H2O program (Measure 1-3)	
Numerator/Denominator	Numerator: Number of members in the denominator who are participating in H2O Denominator: Number of members eligible for H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Claims/encounter data
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

Percentage of members participating in H2O who completed an assessment who established a housing care plan (Measure 1-4)	
Numerator/Denominator	Numerator: Number of members in the denominator who established a housing care plan Denominator: Number of members participating in H2O who completed an assessment
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

Percentage of members participating in H2O, who are receiving H2O services (any service and by service category) (Measure 1-5)	
Numerator/Denominator	Numerator: Number of members in the denominator receiving each service: <ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul> Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A

**Percentage of members participating in H2O, who are receiving H2O services (any service and by service category) (Measure 1-5)**

Data Source	<ul style="list-style-type: none"> <li>AHCCCS/H2O list of members receiving services</li> <li>Claims/encounter data</li> <li>Outreach is through provider invoicing process</li> </ul>
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

**Number of members on the AHCCCS Housing Program (AHP) waitlist who are also H2O eligible (Measure 1-6)**

Numerator/Denominator	Numerator: Number of members on the AHP waitlist who are also H2O eligible Denominator: N/A
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	AHP waitlist
Desired Direction	Lower is better
Analytic Approach	Descriptive time series
Frequency	Annual

**Percentage of members referred to receive short term rental assistance who locate housing within 120 days (Measure 1-7)**

Numerator/Denominator	Numerator: Number of members in the denominator who locate housing within 120 days Denominator: Number of members referred to receive short term rental assistance
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	Descriptive time series
Frequency	Annual

**Number of enhanced shelter bed inventory statewide (Measure 1-8)**

Numerator/Denominator	Numerator: Number of available enhanced shelter bed inventory statewide Denominator: N/A
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A

**Number of enhanced shelter bed inventory statewide (Measure 1-8)**

Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>U.S. Department of Housing and Urban Development (HUD) Homelessness Data Exchange (HDX) Point in Time Count (PIT)</li> <li>HUD HDX Housing Inventory Count (HIC) data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>Interrupted time series (ITS)</li> </ul>
Frequency	Annual/Monthly

**Research Question 1.2: How do State and local government investments in housing supports change in relation to H2O demonstration funding?**

**Change in investment of housing interventions outside of the demonstration (Measure 1-9)**

Numerator/Denominator	N/A
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>Key Informant Interviews (Implementation Question 7)</li> <li>AHCCCS Reports</li> </ul>
Desired Direction	N/A
Analytic Approach	<ul style="list-style-type: none"> <li>Qualitative Synthesis</li> <li>Descriptive Analysis</li> </ul>
Frequency	Annually

**Research Question 1.3: How does the H2O demonstration impact rates of HRSN and their severities?**

**Percentage of members who participated in H2O services that received a HRSN/social determinants of health (SDOH) screening with the Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences (PRAPARE) screening tool or other appropriate screening tool (Measure 1-10)**

Numerator/Denominator	Numerator: Number of H2O participating members in the denominator who received an HRSN/SDOH screening. Denominator: Number of members participating in H2O.
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A

**Percentage of members who participated in H2O services that received a HRSN/social determinants of health (SDOH) screening with the Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences (PRAPARE) screening tool or other appropriate screening tool (Measure 1-10)**

Data Source	<ul style="list-style-type: none"> <li>• Claims/encounter data (G codes, Z codes, and Healthcare Common Procedure Coding System [HCPCS] codes)</li> <li>• Closed loop referral system (CLRS)</li> <li>• Other standardized screening tools</li> <li>• Supplemental data from AHCCCS as appropriate</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Repeated cross-sectional design</li> <li>• Descriptive time series</li> <li>• ITS</li> </ul>
Frequency	Semi-Annually/Annually

**Percentage of members who participated in H2O services that had an HRSN identified, among those who received an HRSN/SDOH screening (Measure 1-11)**

Numerator/Denominator	<p>Numerator: Number of members participating in H2O who had an HRSN identified during an HRSN/SDOH screening.</p> <p>Denominator: Number of members participating in H2O who received an HRSN/SDOH screening.</p>
Comparison Population	N/A
Stratification	N/A <sup>D-2</sup>
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• Claims/encounter data (G codes, Z codes, and HCPCS codes)</li> <li>• CLRS</li> <li>• Other standardized screening tools</li> <li>• Supplemental data from AHCCCS as appropriate</li> </ul>
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>• Repeated cross-sectional design</li> <li>• Descriptive time series</li> <li>• ITS</li> </ul>
Frequency	Semi-Annually/Annually

<sup>D-2</sup> AHCCCS will receive aggregate data for Measures 1-11 and 1-12. As a result, individual level data will not be available for stratifications.

**Percentage of members who had a housing-related need identified, among those who received an HRSN/SDOH screening (Measure 1-12)**

Numerator/Denominator	Numerator: Number of members participating in H2O who had a housing-related need identified during an HRSN/SDOH screening. Denominator: Number of members participating in H2O who received an HRSN/SDOH screening.
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• Claims/encounter data (G codes, Z codes, and HCPCS codes)</li> <li>• CLRS</li> <li>• Other standardized screening tools</li> <li>• Supplemental data from AHCCCS as appropriate</li> </ul>
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>• Repeated cross-sectional design</li> <li>• Descriptive time series</li> <li>• ITS</li> </ul>
Frequency	Semi-Annually/Annually

**Number of unique H2O referrals sent to providers by H2O-PA (H2O-Program Administrator) (any referral and referral type) (Measure 1-13)**

Numerator/Denominator	Numerator: Number of unique H2O referrals sent to providers by the H2O-PA: <ul style="list-style-type: none"> <li>• Outreach and education services</li> <li>• Enhanced shelter</li> <li>• Short term rental assistance</li> <li>• One-time transition and move-in costs</li> <li>• Housing pre-tenancy and tenancy services</li> <li>• Medically necessary home accessibility modifications and remediation</li> </ul> Denominator: N/A
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• H2O referral lists (H2O-PA)</li> <li>• CLRS</li> <li>• Supplemental data from AHCCCS as appropriate</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly



**Percentage of members participating in H2O who were connected to a Regional Behavioral Health Agreement (RBHA) permanent supportive housing (PSH) provider for ongoing supportive services (Measure 1-14)**

Numerator/Denominator	Numerator: Number of members in the denominator who were connected to RBHA PSH provider for ongoing supportive services Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual

**Percent of members with substance use disorder (SUD) diagnosis participating in H2O who connect to outpatient (OP) SUD/recovery services (Measure 1-15)**

Numerator/Denominator	Numerator: Number of members in the denominator who were connected to OP SUD/recovery services Denominator: Number of members participating in H2O with SUD diagnosis
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, primary language, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• Deliverable submitted to AHCCCS by the H2O-PA</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual

Percent of members indicating they were not able to pay mortgage, rent, or utility bills in the last three months (Measure 1-16)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O indicating they experienced housing insecurity.</p> <p><u>Comparison group</u>: Number of comparison group respondents indicating they experienced housing insecurity.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who answered the survey question</p> <p><u>Comparison group</u>: Number of comparison group respondents who answered the survey question</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity <sup>D-3</sup>
Measure Steward	Modified Behavioral Health Risk Factor Surveillance System (BRFSS)
Survey Question	During the last three months, was there a time when you were not able to pay your mortgage, rent or utility bills?
Data Source	Beneficiary Survey
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

Percent of members indicating that a utility company threatened to shut off services in the past three months (Measure 1-17)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of H2O respondents indicating they experienced utility insecurity.</p> <p><u>Comparison group</u>: Number of comparison group respondents indicating they experienced utility insecurity.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of H2O responses to the survey question</p> <p><u>Comparison group</u>: Number of comparison group responses to the survey question</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	Modified BRFSS
Survey Question	During the last three months was there a time when an electric, gas, oil, or water company threatened to shut off services?
Data Source	Beneficiary Survey
Desired Direction	Lower is better

<sup>D-3</sup> Stratifications for survey measures will be limited to age, sex, sexual orientation, gender identity and race/ethnicity to reduce response burden and to ensure a large enough sample size for accurate and anonymous reporting.

**Percent of members indicating that a utility company threatened to shut off services in the past three months (Measure 1-17)**

Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

**Percent of members participating in H2O who are enrolled in the Supplemental Nutrition Assistance Program (SNAP) or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Measure 1-18)**

Numerator/Denominator	<p>Numerator: Number of members in the denominator who are enrolled in SNAP or WIC, stratified by program enrollment.</p> <p>Denominator: Number of members participating in H2O</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• Arizona Department of Health Services (ADHS) and Department of Economic Security (DES) SNAP and WIC data</li> <li>• Claims/Encounter data</li> </ul>
Desired Direction	No desired direction
Analytic Approach	Repeated cross-sectional design
Frequency	Annual/Monthly

**Research Question 1.4: How does the H2O demonstration impact members’ use of HRSN services reflecting crisis events, such as stays in emergency homeless shelters?**

**Number of stays in an emergency shelter per 1,000 members (Measure 1-19)**

Numerator/Denominator	<p>Numerator: Number of stays in an emergency shelter</p> <p>Denominator: N/A</p>
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• HUD HDX PIT and HIC</li> <li>• Data from Continuum of Care (CoC) programs</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

Number of days in an emergency shelter or state of unsheltered homelessness per 1,000 members (Measure 1-20)	
Numerator/Denominator	Numerator: Number of days in an emergency shelter or state of unsheltered homelessness Denominator: N/A
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	HUD HDX PIT and HIC
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> </ul>
Frequency	Annual/Monthly

Percentage of members reporting they used an emergency shelter in the last six months (Measure 1-21)	
Numerator/Denominator	Numerator: <u>Intervention group</u> : Number of members participating in H2O who reported using an emergency shelter in the past six months. <u>Comparison group</u> : Number of comparison group respondents who reported using an emergency shelter in the past six months. Denominator: <u>Intervention group</u> : Number of respondents participating in H2O who answered the survey question. <u>Comparison group</u> : Number of comparison group respondents who answered the survey question.
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	N/A
Survey Question	Survey question in development
Data Source	<ul style="list-style-type: none"> <li>Beneficiary Survey</li> <li>Deliverable submitted to AHCCCS by the H2O-PA</li> </ul>
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>Chi-square</li> <li>Comparison of means</li> </ul>
Frequency	Annual

Percentage of members reporting they slept in a place not meant for human habitation in the last six months (Measure 1-22)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O who reported sleeping in a place not meant for human habitation in the last six months.</p> <p><u>Comparison group</u>: Number of comparison group respondents who reported sleeping in a place not meant for human habitation in the last six months.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who answered the survey question.</p> <p><u>Comparison group</u>: Number of comparison group respondents who answered the survey question.</p>
Comparison Population	Members eligible for H2O who are not participating in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	N/A
Survey Question	Survey question in development
Data Source	Beneficiary Survey
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annually

**Research Question 1.5: Is the H2O demonstration associated with increased positive health and wellbeing outcomes?**

Percentage of members with housing retention, among members participating in H2O who utilize pre-tenancy/tenancy services (Measure 1-23)	
Numerator/Denominator	<p>Numerator: Number of members in the denominator with housing retention</p> <p>Denominator: Number of members participating in H2O who utilize pre-tenancy/tenancy services</p>
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains <sup>D-4</sup>
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

<sup>D-4</sup> Measures 1-23 and 1-24 are reported by program enrollment type. As such, the enrollment counts after stratifying by key subgroups may be too small to report. In this case, the independent evaluator will limit reporting to when the data has sufficient numerator and denominator counts.

**Percentage of members who exit to permanent housing, among members participating in H2O who utilize enhanced shelter services (Measure 1-24)**

Numerator/Denominator	Numerator: Number of members in the denominator who exit to permanent housing Denominator: Number of members participating in H2O who utilize enhanced shelter services
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of members participating in H2O whose housing condition was upgraded during the past month (Measure 1-25)**

Numerator/Denominator	Numerator: Number of members in the denominator whose housing condition was upgraded during the past month Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of members participating in H2O who are leaving the H2O program (Measure 1-26)**

Numerator/Denominator	Numerator: Number of members in the denominator who left the H2O program due to: <ul style="list-style-type: none"> <li>• Positive exit reasons: Completed Program, Voluntary Withdrawal</li> <li>• Negative exit reasons: Abandonment, Failure to Locate Housing, Non-Compliance, Failure to Recertify, Incarcerated, Unknown</li> <li>• Neutral: Higher Level of Care, Deceased</li> </ul> Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A

**Percentage of members participating in H2O who are leaving the H2O program (Measure 1-26)**

Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of members participating in H2O who reported employment during engagement (Measure 1-27)**

Numerator/Denominator	Numerator: Number of members in the denominator who reported employment during engagement Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of members participating in H2O who increased employment during past month (Measure 1-28)**

Numerator/Denominator	Numerator: Number of members in the denominator who increased employment during the past month Denominator: Number of members participating in H2O
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

Change in income among members participating in H2O who utilize pre-tenancy/tenancy services (Measure 1-29)	
Numerator/Denominator	Numerator: Number of members with a change in income Denominator: Number of members participating in H2O who utilize enhanced shelter services
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> </ul>
Frequency	Annual/Monthly

**Research Question 1.6: How does the H2O demonstration impact disparities in HRSN?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations	
Numerator/Denominator	Numerator: <u>Intervention group</u> : All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure. <u>Comparison group</u> : All positive numerator hits among comparison group members separated by each key subpopulation group, by measure. Denominator: <u>Intervention group</u> : All members participating in H2O in each key subpopulation category, by measure. <u>Comparison group</u> : All comparison group members in each key subpopulation category, by measure.
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> <li>Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable



**Research Question 1.6.1: Does the H2O demonstration mitigate or reduce HRSN among groups who had high rates at baseline?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> <li>Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Research Question 1.6.2: Do any groups experience increasing or worsening HRSN compared to the baseline with the implementation of the H2O demonstration?**

All the above Hypothesis 1 measures for use of HRSN services by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A

**All the above Hypothesis 1 measures for use of HRSN services by key subpopulations**

Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> <li>• Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Hypothesis 2: By meeting or reducing the severity of HRSN, the demonstration will increase members’ use of preventive and routine care and reduce their use of potentially avoidable hospital and institutional care (emergency department [ED] visits, inpatient [IP] care, and nursing facilities), leading to reduced healthcare spending over time. Impacts will be realized overall and among subpopulations who experience disparities in hospital and institutional care use.**

**Research Question 2.1: How does the H2O demonstration impact the use of preventive and routine care?**

**Percentage of adults who accessed preventive/ambulatory health services (Measure 2-1)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O with an ambulatory or preventive care visit.</p> <p><u>Comparison group</u>: Number of comparison group members with an ambulatory or preventive care visit.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of members participating in H2O 20 years and older.</p> <p><u>Comparison group</u>: The total number of comparison group members 20 years and older.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	National Committee for Quality Assurance (NCQA)
Measure Name	Adults’ Access to Preventive/Ambulatory Health Services (AAP)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Percentage of members who have a primary care provider (PCP) visit since their intake date, among members participating in H2O who utilize enhanced shelter services (Measure 2-2)**

Numerator/Denominator	Numerator: Number of members in the denominator who had a PCP visit in the first year since their intake date Denominator: Number of members participating in H2O who utilize enhanced shelter services
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Comparison Population	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable submitted to AHCCCS by the H2O-PA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of adults with a flu vaccine (Measure 2-3)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of members participating in H2O stating they had a flu shot or nasal flu spray since July 1, &lt;year&gt;</p> <p><u>Comparison group:</u> Number of comparison group members stating they had a flu shot or nasal flu spray since July 1, &lt;year&gt;</p> <p>Denominator:</p> <p><u>Intervention group:</u> Number of respondents to survey question about flu shot or spray among members participating in H2O.</p> <p><u>Comparison group:</u> Number of respondents to survey question about flu shot or spray among comparison group members</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, gender identity, sexual orientation, and race/ethnicity
Measure Steward	NCQA
Survey Question	Have you had a flu shot since July 1 of the prior year?
Data Source	Beneficiary Survey
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

Percentage of adult members with a cervical cancer screening (Measure 2-4)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of women participating in H2O ages 21–64 who were screened for cervical cancer.</p> <p><u>Comparison group:</u> Number of women in the comparison group ages 21–64 who were screened for cervical cancer.</p> <p>Three rates are reported:</p> <ul style="list-style-type: none"> <li>• Women 21–64 years of age who had cervical cytology performed within the last three years.</li> <li>• Women 30–64 years of age who had cervical high-risk human papillomavirus testing performed within the last five years.</li> <li>• Women 30–64 years of age who had cervical cytology/high-risk human papillomavirus co-testing within the last five years.</li> </ul> <p>Denominator:</p> <p><u>Intervention group:</u> The total number of women participating in H2O between 21 and 64 years old.</p> <p><u>Comparison group:</u> The total number of women in the comparison group between 21 and 64 years old</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, gender identity, sexual orientation, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Cervical Cancer Screening (CCS-AD)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of adult members with a breast cancer screening (Measure 2-5)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of women participating in H2O 50–74 years of age who had a mammogram to screen for breast cancer.</p> <p><u>Comparison group:</u> Number of women in the comparison group 50–74 years of age who had a mammogram to screen for breast cancer.</p> <p>Denominator:</p> <p><u>Intervention group:</u> The total number of women participating in H2O between 50 and 74 years of age.</p> <p><u>Comparison group:</u> The total number of women in the comparison group between 50 and 74 years of age</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist

Percentage of adult members with a breast cancer screening (Measure 2-5)	
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Breast Cancer Screening (BCS-AD)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percent of adult members with a colorectal cancer screening (Measure 2-6)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O, 45–74 years of age who had appropriate screening for colorectal cancer.</p> <p><u>Comparison group</u>: Number of members in the comparison group 45–74 years of age who had appropriate screening for colorectal cancer.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of members participating in H2O 45–74 years of age.</p> <p><u>Comparison group</u>: The total number of members 45–74 years of age in the comparison group</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Colorectal Cancer Screening (COL-AD)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members that were provided a most effective or moderately effective method of contraception (Measure 2-7)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Members participating in H2O 15–44 years of age at risk of unintended pregnancy who received contraception.</p> <p><u>Comparison group:</u> Members in the comparison group 15–44 years of age at risk of unintended pregnancy who received contraception.</p> <p>Two rates are reported:</p> <ul style="list-style-type: none"> <li>Members who were provided a most effective or moderately effective method of contraception.</li> <li>Members who were provided a long-acting reversible method of contraception.</li> </ul> <p>Denominator:</p> <p><u>Intervention group:</u> The total number of members participating in H2O 15–44 years of age.</p> <p><u>Comparison group:</u> The total number of comparison group members 15–44 years of age.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	OPA
Measure Name	Contraceptive Care – All Women (CCW-AD)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members that received a prenatal and/or postpartum care visit (Measure 2-8)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of deliveries of live births members participating in H2O.</p> <p><u>Comparison group:</u> Number of deliveries of live births among comparison group members.</p> <p>Two rates are reported:</p> <ul style="list-style-type: none"> <li>Number of deliveries that received a prenatal care visit in the first trimester, on or before the enrollment start date or within 42 days of enrollment in the organization</li> <li>Number of deliveries that had a postpartum visit on or between seven and 84 days after delivery</li> </ul> <p>Denominator:</p> <p><u>Intervention group:</u> The total number of members participating in H2O with a delivery.</p> <p><u>Comparison group:</u> The total number of comparison group members with a delivery.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA

**Percentage of members that received a prenatal and/or postpartum care visit (Measure 2-8)**

Measure Name	Postpartum Care (PPC)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

**Percentage of members with a diagnosis of human immunodeficiency virus (HIV) who did not have a medical visit in the last six months of the measurement year (Measure 2-9)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of members participating in H2O in the denominator who did not have a medical visit in the last 6 months of the measurement year.</p> <p><u>Comparison group:</u> Number of comparison group members in the denominator who did not have a medical visit in the last 6 months of the measurement year.</p> <p>Denominator:</p> <p><u>Intervention group:</u> The total number of members participating in H2O with a diagnosis of HIV who had at least one medical visit in the first six months of the measurement year.</p> <p><u>Comparison group:</u> The total number of members in the comparison group with a diagnosis of HIV who had at least one medical visit in the first six months of the measurement year</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	Health Resources and Services Administration (HRSA)
Measure Name	Gap in HIV Medical Visits
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

**Research Question 2.2: How does the H2O demonstration impact the use of behavioral health (BH) services?**

Percentage of members who had initiation of alcohol and other drug abuse or dependence treatment (Measure 2-10)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O in the denominator who had initiation of treatment within 14 days of the index episode.</p> <p><u>Comparison group</u>: Number of comparison group members in the denominator who had initiation of treatment within 14 days of the index episode.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O aged 13 and over during the measurement year with an alcohol or opioid diagnosis.</p> <p><u>Comparison group</u>: The number of comparison group members aged 13 and over during the measurement year with an alcohol or opioid diagnosis.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Initiation and Engagement of SUD Treatment: Initiation of SUD Treatment (IET)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members who had engagement of alcohol and other drug abuse or dependence treatment (Measure 2-11)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O who had initiation of treatment within 14 days of the index episode and two or more engagement episodes within 34 days of the initiation episode.</p> <p><u>Comparison group</u>: Number of comparison group members who had initiation of treatment within 14 days of the index episode and two or more engagement episodes within 34 days of the initiation episode.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O aged 13 and over during the measurement year with an alcohol or opioid diagnosis.</p> <p><u>Comparison group</u>: The number of comparison group members aged 13 and over during the measurement year with an alcohol or opioid diagnosis.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA



Percentage of members who had engagement of alcohol and other drug abuse or dependence treatment (Measure 2-11)	
Measure Name	Initiation and Engagement of SUD Treatment: Initiation of SUD Treatment (IET)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members with a follow-up visit after hospitalization for mental illness (Measure 2-12)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Of the IP discharges identified among members participating in H2O in the denominator, the number that resulted in follow-up care with a mental health provider within seven and 30 days.</p> <p><u>Comparison group</u>: Of the IP discharges identified among comparison group members in the denominator, the number that resulted in follow-up care with a mental health provider within seven and 30 days.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Intervention group: The number of IP discharges with a diagnosis of mental illness or intentional self-harm among members participating in H2O six years and older.</p> <p><u>Comparison group</u>: The number of IP discharges with a diagnosis of mental illness or intentional self-harm among members in the comparison group six years and older</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Follow-Up After Hospitalization for Mental Illness (FUH)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members with a follow-up visit after ED visit for members with multiple high-risk chronic conditions (Measure 2-13)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Of the ED visits identified among members participating in H2O in the denominator, the number that resulted in a follow-up visit within seven days.</p> <p><u>Comparison group</u>: Of the ED visits identified among comparison group members in the denominator, the number that resulted in a follow-up visit within seven days.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of ED visits where the member had a chronic condition prior to the ED visit among members participating in H2O 18 years and older.</p> <p><u>Comparison group</u>: The number of ED visits where the member had a chronic condition prior to the ED visit among comparison group members 18 years and older.</p> <p>Chronic conditions include:</p> <ul style="list-style-type: none"> <li>• Chronic obstructive pulmonary disease and asthma</li> <li>• Alzheimer’s disease and related disorders</li> <li>• Chronic kidney disease</li> <li>• Depression</li> <li>• Acute myocardial infraction</li> <li>• Atrial fibrillation</li> <li>• Stroke and ischemic attack</li> </ul>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Follow-Up After Emergency Department Visit for People with Multiple High-Risk Chronic Conditions (FMC)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members with follow-up after ED visit for alcohol and other drug abuse or dependence (Measure 2-14)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Of the ED visit identified among members participating in H2O in the denominator, the number that had a follow-up visit for alcohol and other drug abuse or dependence within eight and 31 days.</p> <p><u>Comparison group</u>: Of the ED visit identified among comparison group members in the denominator, the number that had a follow-up visit for AOD within eight and 31 days.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of ED visits with a principal diagnosis of SUD, or any diagnosis of drug overdose among members participating in H2O, 13 years and older.</p> <p><u>Comparison group</u>: The number of ED visits with a principal diagnosis of SUD, or any diagnosis of drug overdose among members in the comparison group, 13 years and older</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Follow-Up After ED Visit for SUD (FUA)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members who remained on antidepressant medication treatment (Measure 2-15)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O who remained on an antidepressant medication treatment.</p> <p><u>Comparison group</u>: Number of members in the comparison group who remained on an antidepressant medication treatment.</p> <p>Two rates are reported:</p> <ul style="list-style-type: none"> <li>Members who remained on antidepressant medication treatment for at least 84 days</li> <li>Members who remained on antidepressant medication treatment for at least 180 days</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O aged 18 and older who were treated with antidepressant medication and had a diagnosis of major depression.</p> <p><u>Comparison group</u>: The number of comparison group members aged 18 and older who were treated with antidepressant medication and had a diagnosis of major depression</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains

Percentage of members who remained on antidepressant medication treatment (Measure 2-15)	
Measure Steward	NCQA
Measure Name	Antidepressant Medication Management (AMM)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members with opioid use disorder (OUD) who filled a prescription for or were administered or dispensed a United States Food and Drug Administration (FDA)-approved medication for the disorder (Measure 2-16)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: The number of OUD members participating in H2O with evidence of at least one prescription filled, or who were administered or dispensed an FDA-approved medication for OUD, by medication cohort.</p> <p><u>Comparison group</u>: The number of OUD members in the comparison group with evidence of at least one prescription filled, or who were administered or dispensed an FDA-approved medication for OUD, by medication cohort.</p> <p>Medication cohorts are stratified by the following:</p> <ul style="list-style-type: none"> <li>Total</li> <li>Buprenorphine</li> <li>Oral naltrexone</li> <li>Long-acting, injectable naltrexone</li> <li>Methadone</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O 18 to 64 years of age who had at least one encounter with a diagnosis of opioid abuse, dependence, or remission.</p> <p><u>Comparison group</u>: The number of members in the comparison group 18 to 64 years of age who had at least one encounter with a diagnosis of opioid abuse, dependence, or remission.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	CMS Adult Core Set
Measure Name	Use of Pharmacotherapy for Opioid Use Disorder (OUD-AD)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better

**Percentage of members with opioid use disorder (OUD) who filled a prescription for or were administered or dispensed a United States Food and Drug Administration (FDA)-approved medication for the disorder (Measure 2-16)**

Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Percentage of members with schizophrenia who adhered to antipsychotic medications (Measure 2-17)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O in the denominator who remained on an antipsychotic medication for at least 80 percent of their treatment period.</p> <p><u>Comparison group</u>: Number of comparison group members in the denominator who remained on an antipsychotic medication for at least 80 percent of their treatment period.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O aged 19 to 64 with schizophrenia or schizoaffective disorder and were dispensed antipsychotic medication.</p> <p><u>Comparison group</u>: The number of comparison group members aged 19 to 64 with schizophrenia or schizoaffective disorder and were dispensed antipsychotic medication</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Adherence to Antipsychotic Medications for Individuals with Schizophrenia (SAA)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Percentage of members who reported a substance use problem who experienced improvement on Brief Assessment of Recovery Capital (BARC)-10 (Measure 2-18)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: The number of members participating in H2O in the denominator who experienced improvement on BARC-10.</p> <p><u>Comparison group</u>: The number of members in the comparison group in the denominator who experienced improvement on BARC-10.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of members participating in H2O who reported a substance use problem.</p> <p><u>Comparison group</u>: The total number of members in the comparison group who reported a substance use problem.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP waitlist
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	Deliverable from RBHA
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Research Question 2.3: How does the H2O demonstration impact the use of hospital and institutional care?**

**Number of emergent ED visits per 1,000 member months (Measure 2-19)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of ED visits with an emergent diagnosis code among members participating in H2O. Source for emergent diagnosis codes is currently being researched.</p> <p><u>Comparison group</u>: Number of ED visits with an emergent diagnosis code among members in the comparison group. Source for emergent diagnosis codes is currently being researched.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of member months among all adult members participating in H2O.</p> <p><u>Comparison group</u>: Number of member months among all adult members in the comparison group.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	No desired direction

**Number of emergent ED visits per 1,000 member months (Measure 2-19)**

Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Number of non-emergent ED visits per 1,000 member months (Measure 2-20)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of ED visits with a non-emergent diagnosis code among members participating in H2O. Source for non-emergent diagnosis codes is currently being researched.</p> <p><u>Comparison group</u>: Number of ED visits with a non-emergent diagnosis code among members in the comparison group. Source for non-emergent diagnosis codes is currently being researched.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of member months among all adult members participating in H2O.</p> <p><u>Comparison group</u>: Number of member months among all adult members in the comparison group.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Number of IP stays per 1,000 member months (Measure 2-21)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of IP stays among members participating in H2O.</p> <p><u>Comparison group</u>: Number of IP stays among comparison group members.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of members participating in H2O.</p> <p><u>Comparison group</u>: The total number of comparison group members.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	IP Utilization—General Hospital/Acute Care (IPU)

**Number of IP stays per 1,000 member months (Measure 2-21)**

Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	No desired direction
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

**Risk-adjusted ratio of observed to expected acute IP and observation stay discharges (Measure 2-22)**

Numerator/Denominator	Measure calculations will follow the technical specifications for NCQA measure Acute Hospital Utilization (AHU-HH)
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	Acute Hospital Utilization (AHU)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly



Chronic conditions composite (PQI-92) (Measure 2-23)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of discharges among members participating in H2O 18 years of age and older for the chronic conditions listed below.</p> <p><u>Comparison group</u>: Number of discharges among comparison group members 18 years of age and older for the chronic conditions listed below.</p> <p>Chronic conditions:</p> <ul style="list-style-type: none"> <li>• Diabetes with short-term complications</li> <li>• Diabetes with long-term complications</li> <li>• Uncontrolled diabetes without complications</li> <li>• Diabetes with lower-extremity amputation</li> <li>• Chronic obstructive pulmonary disease</li> <li>• Asthma</li> <li>• Hypertension</li> <li>• Heart failure without a cardiac procedure</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O 18 years and older.</p> <p><u>Comparison group</u>: The number of comparison group members 18 years and older.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	AHRQ
Measure Name	Chronic Conditions Composite (PQI 92)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

Percentage of members with an ED visit for hypoglycemia in older adults with diabetes (Measure 2-24)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number members participating in H2O 67 years of age and older with diabetes (types 1 and 2).</p> <p><u>Comparison group</u>: Number of comparison group members 67 years of age and older with diabetes (types 1 and 2) with the observed conditions below. Two rates are reported:</p> <ul style="list-style-type: none"> <li>Observed ED visits for hypoglycemia.</li> <li>For a subset of members who had at least one dispensing event of insulin within each 6-month treatment period from July 1 of the year prior to the measurement year through December 31 of the measurement year, the observed ED visits for hypoglycemia, stratified by dual eligibility.</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The number of expected members participating in H2O 67 years of age and older with diabetes.</p> <p><u>Comparison group</u>: The number of expected comparison group members 67 years of age and older with diabetes.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual identity, gender orientation, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Emergency Department Visits for Hypoglycemia in Older Adults with Diabetes (EDH)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

**Percentage of members with admission to an institution from the community (Measure 2-25)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: The number of institutional facility admissions from a community residence between August 1 of the year prior to the measurement year and July 31 of the measurement year, among members participating in H2O.</p> <p><u>Comparison group</u>: The number of institutional facility admissions from a community residence between August 1 of the year prior to the measurement year and July 31 of the measurement year, among comparison group members.</p> <p>Three rates are reported:</p> <ul style="list-style-type: none"> <li>• Short stays, from 1 to 20 days</li> <li>• Medium stays, from 21 to 100 days</li> <li>• Long-term stays, from 101 days or more</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of member months during which the member resided in the community for at least one day of the month, among members participating in H2O.</p> <p><u>Comparison group</u>: The total number of member months during which the member resided in the community for at least one day of the month, among comparison group members.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	Centers for Medicare & Medicaid Services (CMS)
Measure Name	Admission to an institution from the community (AIF-HH)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Percent of members who were hospitalized for potentially preventable complications (Measure 2-26)**

Numerator/Denominator	Measure calculations will follow the technical specifications for NCQA measure Hospitalization for Potentially Preventable Complications (HPC)
Comparison Population	N/A
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Hospitalization for Potentially Preventable Complications (HPC)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Lower is better

**Percent of members who were hospitalized for potentially preventable complications (Measure 2-26)**

Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of adult IP discharges with an unplanned readmission within 30 days (Measure 2-27)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Of the acute IP and observation stays identified in the denominator among members participating in H2O, the number that were followed by an unplanned acute readmission for any diagnosis within 30 days.</p> <p><u>Comparison group:</u> Of the acute IP and observation stays identified in the denominator among comparison group members, the number that were followed by an unplanned acute readmission for any diagnosis within 30 days.</p> <p>Denominator:</p> <p><u>Intervention group:</u> The number of members participating in H2O aged 18–64 with an acute IP and observation stay during the measurement year.</p> <p><u>Comparison group:</u> The number of comparison group members aged 18–64 with an acute IP and observation stay during the measurement year.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Plan All-Cause Readmissions (PCR)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> <li>• DiD</li> </ul>
Frequency	Annual/Monthly

**Research Question 2.4.1: How does the H2O demonstration impact disparities in the use of hospital and institutional care?**

All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> <li>Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Research Question 2.4.1: Does the demonstration reduce the use of hospital and institutional care among groups who had high rates at baseline?**

All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A

**All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations**

Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> <li>• Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Research Question 2.4.2: Do any groups experience increasing use of hospital and institutional care compared to the baseline with the implementation of the HRSN demonstration?**

**All the above Hypothesis 2 measures for hospital and institutional care by key subpopulations**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> <li>• Contexture race and ethnicity data</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Hypothesis 3: By meeting or reducing HRSN, the demonstration will improve physical and mental health outcomes among members overall and among subpopulations who experience disparities in physical and mental health outcomes.**

**Research Question 3.1: How does the H2O demonstration impact members’ physical and mental health outcomes?**

Percentage of members who reported a rating of overall health as very good or excellent (Measure 3-1)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of respondents participating in H2O who indicated a high rating of overall health (Very Good or Excellent).</p> <p><u>Comparison group:</u> Number of comparison group respondents who indicated a high rating of overall health (Very Good or Excellent).</p> <p>Denominator:</p> <p><u>Intervention group:</u> Number of respondents participating in H2O who answered the survey question.</p> <p><u>Comparison group:</u> Number of respondents in the comparison group who answered the survey question.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	Consumer Assessment of Healthcare Providers and Systems (CAHPS®) <sup>D-5</sup>
Survey Question	In general, how would you rate your overall health?
Data Source	Beneficiary Survey
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

Percentage of members who reported a rating of overall mental or emotional health as very good or excellent (Measure 3-2)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group:</u> Number of respondents participating in H2O who indicated a high rating of overall mental or emotional health (Very Good or Excellent).</p> <p><u>Comparison group:</u> Number of comparison group respondents who indicated a high rating of overall mental or emotional health (Very Good or Excellent).</p> <p>Denominator:</p> <p><u>Intervention group:</u> Number of respondents participating in H2O who answered the survey question.</p> <p><u>Comparison group:</u> Number of respondents in the comparison group who answered the survey question.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	CAHPS

<sup>D-5</sup> CAHPS® is a registered trademark of the Agency for Healthcare Research and Quality (AHRQ).

Percentage of members who reported a rating of overall mental or emotional health as very good or excellent (Measure 3-2)	
Survey Question	In general, how would you rate your overall mental or emotional health?
Data Source	Beneficiary Survey
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

Percentage of members who reported a rating of life satisfaction as “Satisfied” or “Very Satisfied” (Measure 3-3)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who indicated life satisfaction of “satisfied” or “very satisfied”.</p> <p><u>Comparison group</u>: Number of respondents in the comparison group who indicated life satisfaction of “satisfied” or “very satisfied”.</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who answered the survey question.</p> <p><u>Comparison group</u>: Number of respondents in the comparison group who answered the survey question.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity
Measure Steward	BRFSS
Survey Question	In general, how satisfied are you with your life?
Data Source	Beneficiary Survey
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

Percentage of members who reported “Always” or “Usually” feeling stressed or anxious (Measure 3-4)	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who indicated a high rating of always or usually feeling stressed or anxious (Usually or Always).</p> <p><u>Comparison group</u>: Number of respondents in the comparison group who indicated a high rating of always or usually feeling stressed or anxious (Usually or Always).</p> <p>Denominator:</p> <p><u>Intervention group</u>: Number of respondents participating in H2O who answered the survey question.</p> <p><u>Comparison group</u>: Number of respondents in the comparison group who answered the survey question.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, and race/ethnicity



**Percentage of members who reported “Always” or “Usually” feeling stressed or anxious (Measure 3-4)**

Measure Steward	BRFSS
Survey Question	Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because their mind is troubled all the time. Within the last 30 days, how often have you felt this kind of stress?
Data Source	Beneficiary Survey
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Chi-square</li> <li>• Comparison of means</li> </ul>
Frequency	Annual

**Percentage of births with low birth weight (Measure 3-5)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: The number of resident live births in the intervention group denominator weighing less than 2,500 grams at birth.</p> <p><u>Comparison group</u>: The number of resident live births in the comparison group denominator weighing less than 2,500 grams at birth.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of resident live births among participating in H2O in the reporting period who had a delivery on or after their first program enrollment date.</p> <p><u>Comparison group</u>: The number of resident live births among comparison group members in the reporting period who had a delivery on or after their first program enrollment date.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	CMS Child Core Set
Measure Name	Low Birth Weight (LBW-CH)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Vital Records</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

**Research Question 3.2: How does the H2O demonstration impact members' management of chronic conditions?**

<b>Percentage of members with diabetes with poor hemoglobin control (Measure 3-6)</b>	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O in the denominator whose hemoglobin A1c was at the following levels during the measurement year.</p> <p><u>Comparison group</u>: Number of comparison group members in the denominator whose hemoglobin A1c was at the following levels during the measurement year.</p> <p>Two rates are reported:</p> <ul style="list-style-type: none"> <li>• Members with HbA1c Control (&lt;8.0 percent)</li> <li>• Members with HbA1c Poor Control (&lt;9.0 percent)</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O 18 to 75 years of age with diabetes.</p> <p><u>Comparison group</u>: The number of comparison group members 18 to 75 years of age with diabetes.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Hemoglobin A1c Control for Patients with Diabetes (HBD)
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> </ul>
Desired Direction	Lower is better
Analytic Approach	<ul style="list-style-type: none"> <li>• Pre-test/post-test</li> <li>• ITS</li> </ul>
Frequency	Annual/Monthly

<b>Percentage of members with persistent asthma who had a ratio of controller medications to total asthma medications of at least 50 percent (Measure 3-7)</b>	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of members participating in H2O who had a ratio of controller medications to total asthma medications of 0.50 or greater during the measurement year.</p> <p><u>Comparison group</u>: Number of members in the comparison group who had a ratio of controller medications to total asthma medications of 0.50 or greater during the measurement year.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of members participating in H2O aged 5-64 who were identified as having persistent asthma.</p> <p><u>Comparison group</u>: The number of comparison group members aged 5-64 who were identified as having persistent asthma.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist

**Percentage of members with persistent asthma who had a ratio of controller medications to total asthma medications of at least 50 percent (Measure 3-7)**

Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Asthma Medication Ratio (AMR)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> </ul>
Frequency	Annual/Monthly

**Percentage of members with clinical atherosclerotic cardiovascular disease who received and adhered to statin therapy (Measure 3-8)**

Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: The percentage of members participating in H2O who received statin therapy.</p> <p><u>Comparison group</u>: The percentage of members in the comparison group who received statin therapy.</p> <p>The following rates are reported:</p> <ul style="list-style-type: none"> <li>Members who were dispensed at least one high-intensity or moderate-intensity statin medication</li> <li>Members who remained on a high-intensity or moderate-intensity statin medication for at least 80 percent of the treatment period</li> </ul> <p>Denominator:</p> <p><u>Intervention group</u>: All adult members participating in H2O program (males 21–75 years of age and females 40–75 years of age) who were identified as having clinical atherosclerotic cardiovascular disease (ASCVD).</p> <p><u>Comparison group</u>: All adult members in the comparison group (males 21–75 years of age and females 40–75 years of age) who were identified as having clinical atherosclerotic cardiovascular disease (ASCVD).</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	NCQA
Measure Name	Statin Therapy for Patients with Cardiovascular Disease (SPC)
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> </ul>
Desired Direction	Higher is better
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> </ul>
Frequency	Annual/Monthly

**Research Question 3.3: How does the H2O demonstration impact rates of mortality?**

<b>All-cause mortality rate (Measure 3-9)</b>	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of deaths from any cause among members participating in H2O during the measurement year.</p> <p><u>Comparison group</u>: Number of deaths from any cause among comparison group members during the measurement year.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The total number of members participating in H2O for a given year.</p> <p><u>Comparison group</u>: The total number of members in the comparison group for a given year.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Vital records</li> </ul>
Desired Direction	Lower is better
Analytic Approach	ITS
Frequency	Annual

<b>Maternal mortality rate (Measure 3-10)</b>	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: Number of maternal deaths among members participating in H2O during the measurement year.</p> <p><u>Comparison group</u>: Number of maternal deaths among comparison group members during the measurement year.</p> <p>Denominator:</p> <p><u>Intervention group</u>: The number of women participating in H2O of reproductive age (ages 15–49).</p> <p><u>Comparison group</u>: The number of comparison group women of reproductive age (ages 15–49).</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Vital records</li> </ul>
Desired Direction	Lower is better
Analytic Approach	ITS
Frequency	Annual

**Research Question 3.4: How does the H2O demonstration impact the quality and effectiveness of downstream services?**

Quality and effectiveness of key downstream services of the H2O program (Measure 3-11)	
Numerator/Denominator	The independent evaluator will conduct key informant interviews with subject matter experts identified by AHCCCS. These interviews aim to determine which downstream services were key to the H2O program and the effectiveness of these services. Available data to measure the key downstream services identified through key informant interviews will be utilized to quantify the interview findings.
Comparison Population	N/A
Stratification	N/A
Measure Steward	N/A
Measure Name	N/A
Data Source	Key informant interviews with care coordinators, case managers, and members AHCCCS Reports
Desired Direction	N/A
Analytic Approach	<ul style="list-style-type: none"> <li>Qualitative Synthesis</li> <li>Descriptive Analysis</li> </ul>
Frequency	Annual

**Research Question 3.5: How does the H2O demonstration impact disparities in health outcomes?**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> <li>Contexture race and ethnicity data</li> <li>Beneficiary survey</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Research Question 3.5.1: Does the H2O demonstration improve the physical and mental health outcomes of groups who had poor health outcomes at baseline?**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	<ul style="list-style-type: none"> <li>• State eligibility and enrollment data</li> <li>• Claims/encounter data</li> <li>• Contexture race and ethnicity data</li> <li>• Beneficiary survey</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Research Question 3.5.2: Do any groups experience worsening physical and mental health outcomes compared to the baseline with the implementation of the H2O demonstration??**

All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations	
Numerator/Denominator	<p>Numerator:</p> <p><u>Intervention group</u>: All positive numerator hits among members participating in H2O separated by each key subpopulation group, by measure.</p> <p><u>Comparison group</u>: All positive numerator hits among comparison group members separated by each key subpopulation group, by measure.</p> <p>Denominator:</p> <p><u>Intervention group</u>: All members participating in H2O in each key subpopulation category, by measure.</p> <p><u>Comparison group</u>: All comparison group members in each key subpopulation category, by measure.</p>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP housing waitlist, as applicable
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, primary language, and HRSN domains
Measure Steward	N/A
Measure Name	N/A

**All the above Hypothesis 3 measures for physical and mental health outcomes by key subpopulations**

Data Source	<ul style="list-style-type: none"> <li>State eligibility and enrollment data</li> <li>Claims/encounter data</li> <li>Contexture race and ethnicity data</li> <li>Beneficiary survey</li> </ul>
Desired Direction	N/A
Analytic Approach	Health equity analysis
Frequency	Annual/Monthly, as applicable

**Hypothesis 4: The H2O demonstration will reduce cost of care for members who utilize H2O services.**

**Research Question 4.1: How does the H2O demonstration impact the total cost of care among H2O members compared to members who are eligible but not participating in the H2O demonstration?**

**Total cost of care, stratified by type (Measure 4-1)**

Numerator/Denominator	<p>Total cost of care, stratified by the following categories:</p> <ul style="list-style-type: none"> <li>All facility costs</li> <li>IP facility costs</li> <li>Professional services costs</li> <li>Pharmacy costs</li> <li>Physical health (PH) costs</li> <li>BH costs</li> </ul>
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP waitlist
Measure Steward	N/A
Measure Name	N/A
Data Source	N/A
Desired Direction	N/A
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly

**Total cost of care, stratified by key subpopulations (Measure 4-2)**

Numerator/Denominator	Total cost of care by key subpopulations (age, sex, sexual orientation, gender identity, race/ethnicity, English language proficiency, primary language, disability status, geography, eligibility category, HRSN domains, high-cost high-needs)
Comparison Population	Members eligible for H2O who did not participate in the program or members on the AHP waitlist
Stratification	Age, sex, sexual orientation, gender identity, race/ethnicity, geography, and HRSN domains
Measure Steward	N/A
Measure Name	N/A
Data Source	N/A
Desired Direction	N/A
Analytic Approach	<ul style="list-style-type: none"> <li>Pre-test/post-test</li> <li>ITS</li> <li>DiD</li> </ul>
Frequency	Annual/Monthly