Prioritizing Admission to Mental Health Housing Services Using the Mental Health-Allegheny Housing Assessment (MH-AHA)

FREQUENTLY ASKED QUESTIONS

NOVEMBER 2023

BACKGROUND

What is the Mental Health – Allegheny Housing Assessment (MH-AHA)?

The Mental Health – Allegheny Housing Assessment (MH-AHA) is a decision support tool that helps the Allegheny County Department of Human Services (DHS) prioritize admission to housing services for individuals with serious and persistent mental illness. It was developed because we recognized that the need for Mental Health (MH) housing services far exceeds availability, that we were putting people on the waiting list indefinitely and that we weren't serving the most vulnerable of applicants. In response, we implemented a new process for determining eligibility and prioritizing need for these services. The new process was designed to standardize the way in which eligibility/priority are determined, reduce time on the waiting list, minimize burdensome paperwork, serve those at highest risk of an adverse event if MH housing services are not available, and provide support to individuals who are not eligible for or who will not be offered housing services in the near future.

The tool utilizes data to predict the likelihood of two potential types of adverse events that may occur in an individual's life if they do not receive adequate support for their MH condition over the next 12 months: 1) a mental health inpatient stay and 2) frequent use (4 or more visits) of hospital emergency departments. These events serve as indicators of harm and are things we would like to prevent. The MH-AHA assigns a score that is used as part of the prioritization process. In addition to prioritizing scarce MH housing resources, the MH-AHA will help Allegheny County document unmet MH housing needs created by the gap between limited MH housing resources and the number of high-risk eligible individuals.

What was the approach to prioritizing housing services for individuals with a diagnosis of serious and persistent mental illness?

Prior to implementation of the MH-AHA, the DHS Office of Behavioral Health (OBH) reviewed the referrals and accepted eligible individuals onto a waiting list. Because the need for housing exceeds the capacity of the system, it was possible for people to remain on the waiting list for years.

When an MH housing program reported a vacancy, the OBH team (including representatives from Justice-Related Services (JRS), Community Care Behavioral Health (CCBH), the Community Integration Team, a housing monitor/supervisor and, if appropriate, a Transition-Aged Youth monitor) would meet to select the individual to be offered the placement, considering factors such as date of referral, level of care needed, fit with the available placement and other relevant factors. The process lacked transparency and structure.

Why did DHS and its partners consider developing the MH-AHA?

Consistent with other types of housing, the capacity of our MH housing system does not meet demand. As stated above, an individual could languish on the waiting list for years, not knowing that it was unlikely that a placement would become available for them.

For example, as shown in **Table 1**, fewer than half of individuals added to the waitlist in 2021 received MH Housing under the current system. Under the new system, the number of individuals placed will stay the same, but wait times will be much lower and 80-100% of individuals on the waitlist will receive MH Housing within 90 days.

Comparison of Waitlist Trends from the Current System to Proposed New System[1]

		CURRENT SYSTEM				PROPOSED NEW SYSTEM			
SERVICE GROUPS	DESCRIPTION	% ADDED TO WAITLIST	# ADDED TO WAITLIST	OF THOSE ADDED TO WAITLIST, % THAT RECEIVED MH HOUSING (AS OF 9/2022)	AVERAGE WAIT TIME	% ADDED TO WAITLIST	# ADDED TO WAITLIST	OF THOSE ADDED TO WAITLIST, % THAT RECEIVED MH HOUSING (AS OF 9/2022)	AVERAGE WAIT TIME
Category 1	CRR Apartment, CRR Group	ALL	316	47%	105 days	~55%	174	80%–100%	<= 90 days
Category 2	CMHPCH, PCH, DOM	ALL	51	22%	235 days	~30%	15	80%–100%	<= 90 days
Category 3	24/7	ALL	113	33%	137 days	~40%	44	80%–100%	<= 90 days

Excludes transfers.
The new system won't be perfect on day 1, but we hope to work towards these results.

DHS wanted a more equitable and transparent way to prioritize need and place individuals in the most appropriate setting, so that eligible individuals with the highest objective level of vulnerability would be served first. Using a data-driven approach to determining the likelihood of harm provides an objective and comprehensive picture of the individual's risk and needs and provides information about realistic expectations that can be shared with the referral source and the individual. The new process will result in shorter waiting times and more realistic expectations on the part of individuals and referral sources.

In addition to providing housing intake decisions, the MH-AHA is a data-driven process that can shed light on the needs of individuals who are not eligible or who are eligible but unlikely to be placed quickly. We wanted to design a triage process to identify alternate services for these individuals and hope that lower cost/intensity interventions can be identified to address their immediate needs, thus averting possible crises and the need for hospitalization or other emergency intervention.

And finally, this change will allow us to get a more realistic picture of the systemic need; not just a number on an ever-growing waitlist but a real number of how many people are in need of which types of housing.

[1] Program Definitions are found on the following page.

What is Allegheny County's current array of housing services for individuals with serious mental illness?

The goal of MH housing is to help residents develop skills that will help them maintain mental health stabilization in their current setting while obtaining the highest possible level of independent functioning. The degree of support received by residents can vary from minimal support to significant assistance with Activities of Daily Living (ADLs) and skill building.

The MH-AHA will be applied to three categories of MH housing (**Table 2**).

Categories of MH Housing

Category 1: Group home or apartment living, for up to 24 months with 24/7 staff, to help people learn or re-learn skills and competencies necessary for living in the community. The distinction among the 2 types listed below is whether a group home or apartment setting would best provide the level of support needed to gain these skills.

- Community Residential Rehabilitation Group Home (CRR Group)
- Apartment – Community Residential Rehabilitation (CRR Apartment)

Category 2: Permanent, long-term housing in which individuals receive assistance with all basic needs (e.g., meals, laundry, hygiene, medication administration, assistance scheduling and attending needed medical and psychiatric treatment). These programs support those whose functioning has been impacted by a serious mental illness to the extent that they do not have ability to regain skills needed to live in an independent setting (although that should always remain a consideration for that person).

- Domiciliary Care (Dom Care)
- Personal Care Home (PCH)
- Community Mental Health Personal Care Home (CMHPCH)

Category 3: 24/7 – Long-term, permanent housing program. Individuals typically live in the community in one building or in an apartment located in a complex but can reach out to staff 24/7 if experiencing a crisis or in need of temporary assistance.

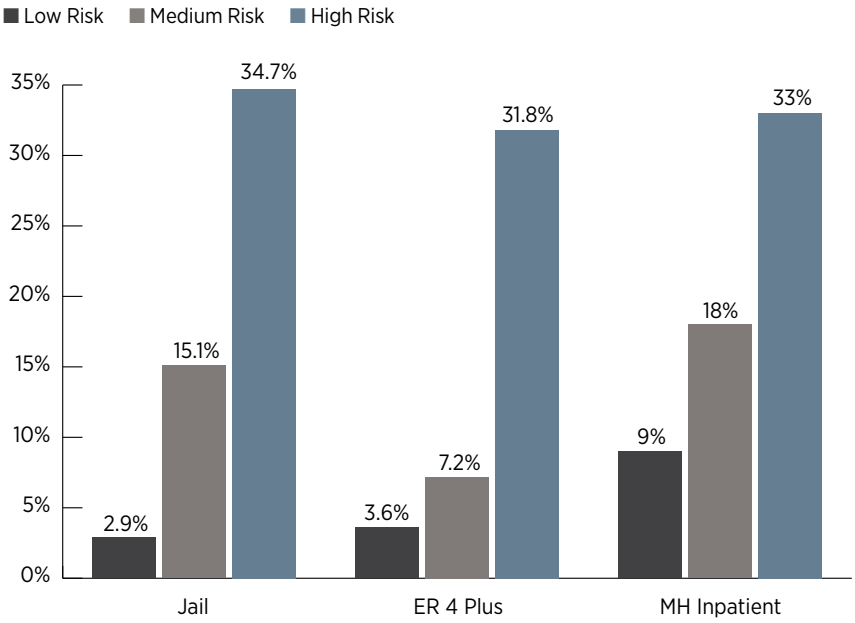
WHAT IS THE MH-AHA?

What is the MH-AHA's analytic approach and what does the model predict?

The MH-AHA uses data to predict the likelihood of two types of events occurring in a person's life over the next 12 months if they do not receive MH housing: 1) a mental health inpatient stay or 2) frequent use (four or more visits) of hospital emergency rooms. These events serve as indicators of harm if the individual's MH housing needs are not addressed. The model predicts the likelihood of these negative outcomes occurring within one year of referral.

In **Figure 1** below, we look at the likelihood of the two negative outcomes occurring, based on low (approximately 1–3), medium (approximately 4–7) and high risk (approximately 7–10) scores. An individual with a high-risk score is almost 9 times more likely to have at least 4 visits to the emergency department, while an individual with a high risk score is more than 3 ½ time more likely to have an MH inpatient stay.

FIGURE 1: Rates of 4 or more ER visits and MH inpatient visits by Score Group in Baseline Model



What data does the MH-AHA's PRM use?

The model uses administrative data from the Allegheny County Data Warehouse, including demographics (e.g., age and gender, but not race) and service records (e.g., child protective services, homeless services, criminal justice, behavioral health and assisted housing). Additional information about the data used in the predictive model and the construction of the model can be found here.

How does the PRM ensure equity and avoid disproportionality?

The predictive model does not explicitly use information on race. This does not mean, however, that other variables in the tool are not correlated with race or other protected attributes. There are other predictors that are correlated with race due to potentially institutionalized racial bias (e.g., different policing practices leading to jail bookings) that would imply that race is still a factor. For this reason, the performance of the MH-AHA model was analyzed with respect to the client's race, disability status, gender and age in the evaluation of the model and an extensive independent equity report. The independent equity evaluation analyzed the performance of the tool across various sub-groups and concluded that they found no evidence of discrepancies in how the tool operated among these sub-groups (except they found it did slightly favor people with disabilities).

If systemic racism limits the ability of Black people to access basic health and wellness services, and as a result leads to Black people having increased usage of crisis services and/or emergency room visits, this will lead to Black people having a higher risk score. The higher score will give them higher priority on the waiting list for housing services.

DEVELOPING MH-AHA

Has the local community been involved in the development of MH-AHA?

DHS carried out a stakeholder engagement process throughout the development of the Allegheny Housing Assessment (AHA) and expanded that engagement with providers and DHS staff during the development of the MH-AHA. Additional engagement with judges was a key element of this phase as judges have grown to rely on these housing options.

What has the community response been, both positive and negative?

The impact of the MH-AHA is primarily felt by the individuals, and while overall people seem to agree that we needed to move to shorter wait-times and a more streamlined process, some will still have mixed feelings about its implementation. This can be understood by considering the role that the waiting list played prior to implementation of the MH-AHA. Previously, when a referral was made to OBH for MH housing, any individual deemed eligible would be placed on a waiting list. Even though being on the waiting list provided no certainty of placement, it was an indication that the individual was "in the system" which often meant that other steps that could have settled the person earlier were not being taken because of the expectation that at some point in time, possibly years later, the client would be given a placement. But with the MH-AHA, an objective score provides a clear and realistic picture of when and if housing will become available. Individuals who score low on the MH-AHA, whether eligible or ineligible, will no longer be on a waiting list; providers will now be expected to develop a strategy to meet their needs without the waiting list fallback position. This requires a different level of diligence on the part of the provider and investment in additional services and supports.

The impact evaluation for which we are planning to contract with researchers will help to provide people with some independent evidence as to whether the move is achieving the anticipated system-level changes.

How has DHS involved experts from outside of Allegheny County in the development of MH-AHA?

Input was sought from experts from several fields during the development of the original AHA. DHS participated in and helped to convene multiple meetings with experts from several fields, including researchers and machine learning experts, homelessness policy and program administration experts, representatives from HUD, cyber law experts, ethicists and privacy experts. DHS also made several presentations on the development of the AHA at national conferences.

These activities provided valuable feedback to DHS across the domains of machine learning, ethical use of algorithms in the public sector, and how advanced analytics such as predictive risk models can most effectively be used.

What exactly will be generated and how and with whom will it be shared?

A score from 1 to 10 will be generated and used to help prioritize individuals on the MH Housing waiting list. Scores are not shared with the referral source or the individual; they are simply notified if the individual is eligible or not.

Where a score is not generated due to insufficient information, an alternative assessment is being developed to be used to produce an MH-AHA score. In the meantime, these individuals are being reviewed by DHS's OBH Referral Review Team.

What happens when data are inadequate to generate a score?

The Centre for Social Data Analytics at the Auckland (New Zealand) University of Technology (CSDA) research team is in the process of developing an alternative assessment that will consider a number of inputs, such as diagnosis and recent service involvement (e.g., jail and hospitalizations), to develop a score to determine eligibility. Because this information is not available to DHS, the assessment will rely on individual self-reports. This alternative assessment will be used more often for individuals who are new to Allegheny County or who have moved in and/or back to the county recently.

IMPLEMENTATION

When did MH-AHA launch?

The MH-AHA launched on 2/1/2023.

Can anyone opt out of having the MH-AHA used to determine their housing priority?

We believe that the MH-AHA more effectively assesses risk of harm and level of need. Thus, we will use it in all situations where sufficient data are available. In cases where we find that there is insufficient administrative data history, or where the professional making the referral believes that the score may not correctly reflect the person's situation, an alternative actuarial assessment is being developed to be used instead. In the meantime, these few clients are being reviewed by the OBH Referral Review Team at DHS.

How will this initiative affect existing service providers?

As discussed previously, the MH-AHA will impact service providers in a significant way. Instead of referring an individual and having them placed on a waiting list, providers will be notified of the individual's status and — if housing is not an immediate option – will have to develop alternate plans to address the individual's needs. The OBH Referral Review Team will connect providers to Community Care Behavioral Health, which will work with them to identify supports, short of housing, to provider greater stability and quality in the lives of the individuals and their caregivers.

Will the system automatically decide on the recipient of a housing vacancy or simply rank individuals and allow for staff input into the final decision. In other words, how automatic is the decision-making?

The MH-AHA tool will not automatically decide on the recipient of the available service. It will only provide a score that will be used to rank individuals based on vulnerability; the OBH Referral Review Team will still be ultimately responsible for making the decision about who is referred to service providers. This is our current business process.

It's important to understand that risk scoring does not automatically place an individual in "first place" for the next available slot. Type of slot and individual needs (e.g., gender expression, age, need for ADA accommodations or assistance with activities of daily living) will also play a role in placement decisions.

Is the MH-AHA score assigned to a person permanently?

No, the MH-AHA score represents a score at a given time. If a person has additional contact with any services, the assessment can be repeated and the new score will reflect updated and/or additional service experience.

What safeguards are in place to make sure the MH-AHA is working appropriately?

DHS is committed to ensuring that the MH-AHA is working and will engage in quality assurance throughout implementation and maintenance. We will seek feedback from different sources of on-the-ground knowledge, such as front-line workers, to understand how the model performs on different groups and how the phenomena being modeled might be changing over time. Additionally, given the large number of databases that are being linked in MH-AHA, quality checks and ongoing model maintenance are critical. Our quality assurance systems check that the data being used do not show anomalies (e.g., sudden breaks in the time trend). We also test predictive accuracy by correlating the score to short-term outcomes that we know the score should be strongly correlated to, such as ER visits within a few months of receiving the score.

We are planning to contract with researchers to undertake an independent evaluation of whether the MH-AHA has improved outcomes by ensuring that those clients who have the highest needs have been prioritized for MH housing.

Will the County improve MH-AHA over time?

DHS is committed to improving the MH-AHA over time, following a procedure similar to that which has resulted in modifications to other data-driven tools. This will include updating the model and related policies as source systems and variables are revisited, as well as in response to feedback from clients and providers.

ANALYTICS SUPPORTING THE MH-AHA

Did you externally validate the model?

Yes, an external validation was performed on the AHA using mortality within 12 months of a client's contact with the Allegheny Link. According to our findings, those who were predicted to have high risk (top 10%) had a 3.61 times higher likelihood (95% confidence interval [2.12, 6.16]) of having a reported death within 12 months of their contact with Allegheny Link, compared to the bottom 90% suggesting that the outcomes chosen are a good proxy for harm if left unhoused.

For the MH-AHA model, we define high risk as a score of 7–10 on the MH-AHA model. For self-harm / suicidal hospitalization, we find that clients who score high on the MH-AHA model are 13.4 (95% confidence interval between 3.0 and 59.6) times as likely to have a suicide or self-harm hospitalization as other clients who are referred to MH housing. For mortality, the rates are also higher but due to the small count, the rate is not statistically significant.

How accurate is the predictive model?

We looked at precision and recall for high-risk score (defined as having a score of 7+). **Table 3** shows these findings. We can see, for example, that 38% of clients who received a high-risk score on the MH-AHA had an instance of MH Inpatient Hospitalization, compared to 14.5% of those with scores less than 6, which tells us that scoring precision is high. Conversely, in the second column, we generated the risk score for those who had an MH Inpatient Hospitalization and found that 52% of those who had been hospitalized scored 7 or higher, compared to 48% of those who had not been hospitalized, demonstrating positive recall. The same pattern holds true for those who had 4 or more emergency room visits.

TABLE 3: **Precision and Recall – High MH-AHA Score**

	PRECISION (PREVALENCE OF OUTCOME AMONG THOSE WHO RECEIVE HIGH MH-AHA)		RECALL (PREVALENCE OF RECEIVING A HIGH MH-AHA SCORE AMONG THOSE WHO RECEIVE THE SCORE)	
	MH INPATIENT (%)	MORE THAN 4 ER VISITS (%)	MH INPATIENT (%)	MORE THAN 4 ER VISITS (%)
MH-AHA score greater than 6	38.13	26.62	51.96	62.71
Others	14.50	6.51	48.04	37.29

How accurate is the MH-AHA alternative assessment?

We are in the process of developing an alternative approach for those few instances where we are unable to generate a score. By nature, these alternative approaches rely on self-assessment of risk factors and are typically not as accurate. We will provide more information once it is developed more fully.

Will DHS conduct an evaluation of the MH-AHA?

The original AHA is being evaluated by researchers at Carnegie Mellon University. We are currently planning to commission a second team of researchers to evaluate the newly adapted MH-AHA. They will provide an analysis of whether the MH-AHA is improving the process and outcomes of the MH housing referral system and make recommendations about its use.