USING PREDICTIVE RISK MODELING TO

Prioritize Services for People Experiencing Homelessness in Allegheny County

Methodology Paper for the Allegheny Housing Assessment

Methodology Update

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Summary

In September 2020 we released a methodology report[1] outlining the introduction of the baseline Allegheny Housing Assessment (AHA) tool in Allegheny County, based on the most recent version of the tool available prior to the preparation of that report (baseline version). However, with the advent of COVID-19, some of the features the model relied on had degraded. For example, courts had lower throughput, jails released inmates early and hospitals were restricting patients. This meant that it was necessary to rebuild the tool excluding those features which had changed significantly when compared to previous years. We anticipate being able to switch back to the baseline version once the pandemic has ended. This update to the methodology report provides the most up-to-date statistics on the rebuilt model that was deployed as of November 2020 (AHA V1.2).

From time to time we will publish further updates so that the broader Allegheny County community is aware of the performance of the tool. However, if readers require details and statistics for the version of the model deployed at a given point in time, they should contact the Allegheny County Department of Human Services directly.

Note that this report should be read in conjunction with the original methodology report – and we have retained the table numbering so the reader can easily identify the comparable information in the original report.

The main changes in Update 1 are:

Removal of features showing structural shifts

- Features that indicate a client's interactions with the various feature domains within the period of three months prior to the assessment were found to be unstable due to COVID-19. We compared the mean values of recent (3 month) system involvement for clients assessed in the March to June period in 2016-2020 to see if 2020 was unusual (statistical significance was established using the t-test and a 95% confidence interval). As expected, given the disruptions that occurred with COVID-19, we found that 2020 was significantly different. This is not surprising given system and behavior changes during COVID-19: courts were shut, hospital attendances declined, housing services increased and the jail population fell. In the rebuild, we excluded 111 features that showed these structural shifts.

Reduction in predictive accuracy of mental health inpatient and ER 4+

- Due to the degradation of some of the variables, version 1.2 of the AHA tool showed lower predictive power. It is important to note that the reported loss of predictive power is

[1] *Using Predictive Risk Modeling to Prioritize Services for People Experiencing Homelessness in Allegheny County*. Centre for Social Data Analytics. Auckland, New Zealand. September 2020.

a result of systemwide changes that occurred (and the fact that the training data used to build the model come from pre-COVID-19 times) and is only an estimate. All elements of the system have been affected by COVID-19 and so the model will have to be tested in the field. We should also note that the accuracy of alternative methods (e.g. the VI-SPDAT) that also rely on similar features (albeit self-reported) would have a similar loss in accuracy. We would expect that when the system reverts to "normal," the baseline model would once again be relevant and performance improved.

	AUC of Allegheny Housing Assessment	
Outcomes	**Version 1.2**	**Baseline Model**
MH inpatient	75.83%	82.70%
Jail Booking	73.61%	71.23%
ER 4+	73.72%	79.19%

Removal of the Substance Use Services outcome

- As we do not use the Substance Use Services model for the reasons discussed in the methodology (see page 21), this update does not refer to this model.

Use of a new version of R package 'glmnet'

- The recent version of the R package, 'glmnet' was used, i.e., Version 4.0-2.

Increase in the sample size

- The most recent housing assessment extraction received from the County consists of 6,054 housing assessments compared to 5,531 we received for the baseline model building. The County has used a slightly different assessment selection method in its most recent retrospective assessment selection – in particular, their initial data set only included those clients who were posted on the bulletin board and excluded 523 assessments where an assessment was made, but the client did not then get added to a waiting list. As a result of the increased sample size: number of unique clients in the study sample, training and testing data partitions and outcome rates presented in table 6 were changed.

Detailed changes and table updates

Changes to the Methodology Report are listed by section, with a reference to the relevant page of the Methodology Report. Direct quotes from the Methodology Report are italicized and replacement text is indicated by bold headings.

Methodology [see p14, Methodology Report]

In this section we describe the methodology used for building the AHA, including some of the explorations we conducted to arrive at the final model.

Replacement para 2:

Data

The research data set comprised 6,054 homelessness assessments conducted between January 2016 and March 2017 by the Allegheny Link. While assessments are conducted for household units, the research data set is unique at the adult-assessment level. For example, if there were two adults in an assessment, they are represented by two rows of data in the research data set. The 6,054 of research data represents 4,590 unique clients.

replacement paras 3 & 4:

Coded features

Allegheny County maintains an integrated data warehouse, allowing for an assessment based on a set of features to be built from data about the relevant individuals, at the assessment date, to be extracted from the following systems: demographics, prior intervention with homeless services, prior interventions with assisted housing services, child welfare, juvenile probation, jail, courts, behavioral health, poverty rates and household information. Table4 summarizes the overall domains of the predictor variables.

Over 333 features were built for individuals falling within each of these domains. Where the unit was a family, these features were constructed for each adult as well as other adults and children included in their assessment. This means that individuals in a family assessment have 662 more features which relate to other adults and children in the assessment unit giving them a total of 995 features (111 features fewer than the baseline model overall, due to the removal of features showing structural shifts). For example, the row representing the mother would include details about her partner and children as additional predictors. For the 3,852 rows which only represent a single unit, there would be no such features.

replacement Table 4:

Table4: Overview of Coded Features

Domain	Description / Examples	Count of Predictor Features Tested
Child Welfare	Count of child welfare referrals with one of the roles among parent, alleged perpetrator, victim, child in the last year, 2 years, 3 years or ever, that were screened in, screened out or active.	68
Jail	Count of months spent in Allegheny County Jail in the last year, 2 years, 3 years or ever. A dummy variable to indicate current involvement.	4
Courts	Count of months with different types of court involvement (ex: Probation/Family Delinquency/Common Pleas/Magisterial District) in the last year, 2 years, 3 years or ever. Dummy variables to indicate current involvement.	52
Juvenile Probation	Count of months spent in Juvenile Probation (placement/non-placement) in the last year, 2 years, 3 years or ever. Dummy variables to indicate current involvement.	8
Behavioral and Physical Health[2]	Dummy variables to indicate health incidents in the last year, 2 years, 3 years or ever. Count of days in mental health or physical health services, including crisis, inpatient and selected outpatient services in the last year, 2 years, 3 years or ever	115
Previous interactions with Homeless Services	Count of day/episodes spent in Permanent Supportive Housing (PSH), Rapid Rehousing, Bridge/Transitional, Homeless Prevention Service program, Emergency Shelter and Street Outreach in the last year, 2 years, 3 years or ever.	49

[2] Behavioral and Physical Health includes only those services provided under Medical Assistance or for uninsured individuals

Previous interactions with Assisted Housing	Count of months spent in Allegheny County Housing Authority (ACHA) or Housing Authority of the City of Pittsburgh (HACP) public housing in the last year, 2 years, 3 years or ever.	16
Demographics	Age and gender categories	14
Poverty	Dummy variables to indicate poverty rate category and the Poverty Rates taken from "2008-2012 5-year American Community Survey (ACS) ZIP code statistics".	7
Household	All the above for other adults and other children in the family	662

Characteristics of Assessed Individuals [see p16, Methodology Report]

"Table 5 provides a demographic description of the research data. Note that individuals could be represented multiple times in the research data and in these summary statistics if they had multiple assessments over the study period of January 2016 through March 2017. Gender, age, VI-SPDAT type and disability flag data were extracted from the Allegheny Link application."

replacement para 2:

The majority of clients assessed were Black (54%); 39% were white; 1% were other. This indicates 3% and 2% higher rates of client assessments for Black and white (compared to the baseline), respectively. Race was missing for 6% of the client assessments. Other races and Race-missing client assessments have declined by 2%, and 3% respectively. Similar to the data set we had for baseline models, females and males were evenly split at 50% each. Race-gender breakdown shows that 28% were Black females, 26% were Black males, 18% were white females and 20% were white males. Compared to baseline data set, a 1% and 2% rise in percentages of Black female and Black male were noticed. The differences of remaining race-gender breakdowns were less than 1%. Note that race is provided here as a descriptive statistic only and was never used as a predictor in the model. While there were no significant differences in Family and Youth assessment percentages in this data set, the client assessments belonging to the single household type were increased by approximately 2%.

replacement Table 5:

Table 5: Descriptive statistics of the research data set (n=6,054)

		Count	Percentage
Race	Black	3,279	54%
	White	2,341	39%
	Other	80	1%
	Race Missing	354	6%
Gender	Female	3,031	50%
	Male	2,998	50%
	Gender Missing	25	0.4%
Race-Gender	Black female	1,704	28%
	Black male	1,566	26%
	White female	1,098	18%
	White male	1,230	20%
Household Type	Single	3,852	64%
	Youth	413	7%
	Family	1,789	30%
Disability (self-reported)	Yes	4,958	82%

	No	1,096	18%

Note: Race and Gender are as recorded in the Allegheny County data warehouse. Household type is determined by the type of VI-SPDAT completed by the person; Disability is as reported to The Link by the respondents.

Harm from unstable housing [see p17, Methodology Report]

replacement Table 6:

Table 6: Overview of Outcomes

Outcomes	Description of Target Outcome	Prevalence
Mental Health (MH) Inpatient	At least one inpatient mental health service funded by Medicaid in the 12 months following the assessment	12.62%
Jail Booking	At least one Allegheny County Jail booking in the 12 months following the assessment	15.91%
Emergency Room (ER) 4+ Visits	More than four emergency room visits in the 12 months following the assessment	20.10%
Mortality (for external validation only)	Death registered in Allegheny County death records in the 12 months following the assessment	1.83%

Note: All outcomes are linked to the assessment data by using Allegheny County data linkage systems which generate unique client IDs for everyone who comes into contact with the system.

Modeling Methodology [see p19, Methodology Report]

LASSO regularized Logistic Regression

"The likelihood of experiencing each proxy harm (target outcome) given in was modeled separately using LASSO (Least Absolute Shrinkage and Selection Operator) Regularized Logistic Regression method (Tibshinari, 1996)."

replacement paras 3-6:

First, we partitioned our research data set into a training set containing 4,233 (70%) records and a testing set holding 1,821 (30%) records. Furthermore, when individuals appear multiple times in the data, we partition them to be consistently either in test or training. Additionally, if they are part of a family, we take all members in the family and apply the partition rule to the entire family group, ensuring they appear in test or train only. For this, we use a household identifier as the *blocking variable*. This may allow adults who appear in more than one family unit, to be represented in both test and training sets, this is extremely rare.

After suitable partitioning, each risk model was instantiated through the R package, 'glmnet' (Friedman et al., 2010), version 4.0-2[3] (Friedman et al., 2020). In the model training phase, the LASSO parameter often symbolized as Lambda was optimized within the range of 1e-04 to 100. The Lambda parameter was tuned through a 3-times 10-fold cross-validation procedure. Repeated cross-validation is one of the standard methods to estimate classification error rates (Kim, 2009).

The Area Under the Receiver Operator Characteristic Curve (AUC) from each of the repetitions are averaged. Among 100 different Lambda values that we tested, the Lambda that corresponded to the highest AUC was considered the best Lambda and the corresponding feature weights were chosen as the final model.

All four models were trained on the complete set of predictors (995 features). Table shows the count of weighted features in the final model.

replacement Table 7:

Table 7: Weighted feature count, by Model

Model	**Count of weighted features**
MH Inpatient PRM	24
Jail PRM	44
ER 4+ PRM	09

[3] https://cran.r-project.org/web/packages/glmnet/index.html

Model Methodology Comparisons [see p20, Methodology Report]

replacement paras 2-4:

Table 8 looks at the various measures of predictive accuracies calculated for a hold-out sample of test data (i.e., the data set of 1,821 assessments that were not used to train the model).

"*Column 2 looks at the predictive accuracy as indicated by the AUC, which provides a generalized measure of predictive accuracy. If the AUC is 50% it means that the model provides no advantage in predicting that particular outcome, whereas an AUC of 100% means that a person who has the particular outcome (e.g., MH inpatient stay in the next year) will always get a higher risk score than someone who doesn't have that outcome."*

The Jail model has the highest AUC with 80% [77%, 83%] and the MH Inpatient model has the lowest at 76% [73%, 79%].

"*These results show that these individual models are accurate in ranking people at risk of these harms. Given a randomly selected case known to have the event (A), and a random selected case known to not have the event (B), the AUC is the likelihood that risk(A) > risk(B). For the purposes of ranking and prioritizing people into housing, the AUC therefore provides evidence of "ranking" ability*."

Table 8, column 3, shows the positive predictive value (PPV). This is the share of people who receive a score of 10/10 (i.e., in the top 10% of the 6,054 who are risk scored as 10 and belong to hold-out data) who end up with the outcome that the model is predicting. Of the top 10% of people in the MH inpatient model, 43% end up with an inpatient stay within 12 months of being assessed for homelessness services, the ER 4+ have a PPV of 65%, and Jail bookings have a PPV of 49%.

"*Table 9 displays the model's predictive power with respect to the outcomes that the model is trained on as well as the other outcomes. We calculated the AUC for the model's own outcomes using a hold-out data set that was not used to train the model.* "

Consider the MH Inpatient PRM model, in which the AUC is 76% for predicting MH inpatient stays. Additionally, the model is weakly predictive of ER4+ visits (AUC of 69%) but is weaker at predicting a booking in Jail (AUC of 67%).

replacement Table 8:

Table 8: AUC, Positive Predictive Value (PPV) and True Positive Rates (TPR) of Each model, Testing Set

Model	**AUC (95% confidence interval)**	**PPV for top 10% risk group**	**TPR for top 10% risk group**	**Prevalence (test set)**
MH Inpatient PRM	76% [73%,79%]	43%	33%	12.85%
ER 4+ PRM	79% [76%, 81%]	65%	35%	20.59%
Jail PRM	80% [77%, 83%]	49%	35%	15.54%

Notes: n = 1,821. MH Inpatient: at least one inpatient mental health service funded by Medicaid in the 12 months following the Link assessment. ER 4+ Visits: More than four ER visits in the 12 months following the Link assessment. Jail Booking: at least one Allegheny County Jail booking in the 12 months following the Link assessment

replacement Table 9:

Table 9: AUC of Each Individual Model for Testing Set and Across Models for Complete Set

Model	Outcomes		
	MH Inpatient	ER 4+ Visits	Jail Booking
MH Inpatient PRM	76%	69%	67%
ER 4+ PRM	74%	79%	64%
Jail PRM	67%	61%	80%

Notes: n (modelled outcome) = 1,821; n (non-modelled outcome) = 6,054. MH Inpatient: at least one inpatient mental health service funded by Medicaid in the 12 months following the Link assessment. ER 4+ Visits: More than Four ER visits in the 12 months following the Link assessment. Jail Booking: at least one Allegheny County Jail booking in the 12 months following the Link assessment.

The AHA Tool [see p24, Methodology Report]

replacement Table 12:

Table12: AUC for AHA, by Model for Testing Set only

Outcomes	AUC of AHA
MH inpatient	75.83%
Jail Booking	73.61%
ER 4+	73.72%

Notes: n = 1,821. MH Inpatient: at least one inpatient mental health service funded by Medicaid in the 12 months following the Link assessment. ER 4+ Visits: More than four ER visits in the 12 months following the Link assessment. Jail Booking: at least one Allegheny County Jail booking in the 12 months following the Link assessment.

replacement Table 13:

Table 13: TPR, and PPV of AHA by Outcome, Testing Set

Outcomes	**PPV for top 10% risk group**	**TPR for top 10% risk group**
MH Inpatient	43.85%	24.36%
Jail Booking	46.15%	21.20%
ER 4+	60.77%	21.07%

Notes: n= 1,821. MH Inpatient: at least one inpatient mental health service funded by Medicaid in the 12 months following the Link assessment. ER 4+ Visits: More than four ER visits in the 12 months following the Link assessment. Jail Booking: at least one Allegheny County Jail booking in the 12 months following the Link assessment.

Comparing the predictive accuracy of the AHA with the VI-SPDAT [see p25, Methodology Report]

replacement Table 14:

Table14: AUC of AHA vs VI-SPDAT by Outcome, Testing Set

Outcomes	**AUC of AHA**	**AUC of VI-SPDAT**
Mental health inpatient service	75.83%	62.10%
Jail Booking	73.61%	58.03%
ER 4+	73.72%	58.30%

Notes: n = 1,821. MH Inpatient: at least one inpatient mental health service funded by Medicaid in the 12 months following the assessment. ER 4+ Visits: More than four ER visits in the 12 months following the assessment. Jail Night: at least one Allegheny County Jail booking in the 12 months following the assessment.

References

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Kim, J. H. (2009). Estimating classification error rate: Repeated cross-validation, repeated hold-out and bootstrap. Computational statistics & data analysis, 53(11), 3735-3745.

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Appendix B: Features used for the AHA Model [see p 41, Methodology Report]

replacement Appendix B:

Appendix B: Features used for the AHA Model (V 1.2)

Variable Name	Variable Description	MH Inpatient	Jail Booking	ER 4+ Visits
PRI_BH_VIC_DX_F32_DUMMY_EVER	Dummy if focus client had a prior diagnosis of Major depressive disorder, single episode	+	+	+
PRI_PH_ED_COUNT_1	total number of times the focus client visited the Emergency Room in the last 365 days	+	+	+
PRI_BH_RECORD_EVER	Dummy if focus client had an active behavior health incident	+	+	
PRI_HL_ACJ_COUNT_1	count of months the focus client was incarcerated in the Allegheny County Jail in the last year	+	+	
PRI_HL_CRT_MAJ_DIST_NTR_COUNT_1	count of months client was in CRT MAJ DIST NTR in the last year	+	+	
PRI_MCI_UNIQ_AGE_20_24_DUMMY_OA	Count of adults in the household between the ages of 20-24	+	+	
PRI_MCI_UNIQ_AGE_CHILD_DUMMY_OC	Count of children in the household that are <18 years old at the time of assessment	+	+	
PRI_REF_POV_POVERTY_RATE_OC	Poverty Rate obtained using externally provided Zipcode poverty rate file, this file comes from the 2008-2012 5-year American Community Survey (ACS) ZIP code statistics	+	+	
PRI_BH_IP_REHAB_EVER_COUNT	count of days client was ever in IP REHAB	+		+
PRI_BH_MH_INPTNT_EVER_COUNT	count of days focus client ever received mental health inpatient services	+		+
PRI_BH_ASSMNT_EVER_COUNT	count of prior behavioral health assessments for the focus client	+		
PRI_BH_IP_REHAB_COUNT_3	total number of days the focus client received an inpatient rehab service in the last 1095 days	+		
PRI_BH_MH_EMRGNCY_COUNT_2_OA	maximum number of days in MH EMERGENCY in the last 730 days	+		
PRI_BH_MH_INPTNT_COUNT_1_OA	maximum number of days (of all adults in the household) the client received mental health inpatient services in the last 365 days	+		
PRI_BH_MH_INPTNT_COUNT_2_OA	maximum number of days in MH INPATIENT in the last 730 days	+		
PRI_BH_OP_DA_EVER_COUNT	count of days focus client was ever in OP DA	+		
PRI_BH_VIC_DX_F31_DUMMY_EVER_OA	number of adults who had an active incident of Bipolar disorder	+		
PRI_BH_VIC_DX_F32_DUMMY_EVER_OA	number of adults in the household with a prior diagnosis of Major depressive disorder, single	+		

Variable Name	Variable Description	MH Inpatient	Jail Booking	ER 4+ Visits
	episode			
PRI_HL_CRT_MAJ_DIST_TRF_DUMMY_EVER	count of months the focus client was active with the Magisterial District Court – TRF in the past	+		
PRI_HL_CRT_PROB_DUMMY_EVER	count of months the focus client was under probation supervision in the past	+		
PRI_HL_HH_SERVICE_EPISODES_DUMMY_EVER_OC	Count of children in the household who have received homeless and housing support services	+		
PRI_HL_HH_SHELTER_EPISODES_2_OC	count of episodes in Shelter program, the client was in the last 2 years	+		
PRI_MCI_UNIQ_AGE_ADULT_DUMMY_OA	Count of clients in the household that are >=18 years old at the time of assessment	+		
PRI_MCI_UNIQ_AGE_INF_DUMMY_OC	number of children (age<1) in the household	+		
PRI_HL_ACJ_COUNT_1_OA	Maximum number of months (of all adults in the household) the client was incarcerated in the Allegheny County Jail in the last year		+	+
PRI_HL_CRT_CM_PLS_CRM_COUNT_1	count of months client was in CRT_CM_PLS_CRM in the last year		+	+
PRI_HL_CRT_MAJ_DIST_CRM_COUNT_1	count of months the focus client was active with the Magisterial District Court in the last year		+	+
PRI_BH_ASSMNT_COUNT_1_OA	maximum number of days in ASSESSMENT in the last 365 days		+	
PRI_BH_MH_EMRGNCY_COUNT_1	total number of days in MH EMERGENCY in the last 365 days		+	
PRI_BH_MH_INPTNT_COUNT_1	total number of days in MH INPATIENT in the last 365 days		+	
PRI_BH_OP_DA_COUNT_1_OA	maximum number of days in OP DA in the last 365 days		+	
PRI_BH_VIC_DX_F12_DUMMY_EVER	dummy=1 if focus client had an active incident of Cannabis related disorders		+	
PRI_HL_ACJ_COUNT_2	count of months the focus client was incarcerated in the Allegheny County Jail in the last 2 years		+	
PRI_HL_ACJ_COUNT_3	count of months client was in ACJ in the last 3 years		+	
PRI_HL_ACJ_COUNT_3_OA	maximum number of months (of all adults in the household) the client was incarcerated in the Allegheny County Jail in the last 3 years		+	
PRI_HL_ACJ_DUMMY_EVER	count of months the focus client was incarcerated in the Allegheny County Jail in the past		+	
PRI_HL_CRT_ALL_COUNT_1	count of months the focus client was active in the Courts in the last year		+	
PRI_HL_CRT_ALL_COUNT_2	count of months client was in CRT_ALL in the last 2 years		+	

Variable Name	Variable Description	MH Inpatient	Jail Booking	ER 4+ Visits
PRI_HL_CRT_ALL_DUMMY_EVER	count of months the focus client was court-active in the past		+	
PRI_HL_CRT_CM_PLS_CRM_DUMMY_EVER	count of months client was ever in CRT_CM_PLS_CRM		+	
PRI_HL_CRT_FAM_DEPEND_COUNT_1	count of months client was in CRT FAM DEPEND in the last year		+	
PRI_HL_CRT_FAM_DEPEND_COUNT_1_OA	maximum count of months adult was in CRT FAM DEPEND in the last year		+	
PRI_HL_CRT_PROB_COUNT_2	count of months client was in CRT Prob in the last 2 years		+	
PRI_HL_CYF_REF_ACCEPT_FOR_SERVICE_1_COUNT	count of prior client welfare referrals for client that were accepted for service in the last 1 year		+	
PRI_HL_CYF_REF_ACCEPT_FOR_SERVICE_1_COUNT_OA	maximum count of prior client welfare referrals for client that were accepted for service in the last 1 year		+	
PRI_HL_CYF_REF_CHIL_SCO_1_COUNT_OC	maximum count of child welfare referrals (of all children in the household) for the child in the last 1 year that were screened out		+	
PRI_HL_HA_RES_HACP_COUNT_2_OC	maximum count of months client was in public housing support from Housing Authority of the City of Pittsburgh (HACP) in the last 2 years		+	
PRI_HL_HA_RES_HACP_DUMMY_EVER_OA	maximum count of months adult was ever in public housing support from Housing Authority of the City of Pittsburgh (HACP)		+	
PRI_HL_HA_S8_ACHA_DUMMY_EVER_OA	maximum count of months adult was ever in Section 8. Administered locally by the Allegheny maximum county Housing Authority (ACHA)		+	
PRI_HL_HH_SHELTER_DAYS_2	count of days the client was in Shelter program in the last 2 years		+	
PRI_HL_HH_SHELTER_EPISODES_1_OC	count of episodes in Shelter program, the client was in the last year		+	
PRI_HL_HH_TRANSITIONAL_DAYS_3_OA	maximum number of days any adult was in Transitional program in the last 3 years		+	
PRI_HL_HH_TRANSITIONAL_DAYS_DUMMY_EVER_OA	maximum number of days (of all adults in the household) the client was ever in Bridge/Transition al/Rapid Re-Housing		+	
PRI_HL_JPO_PLACE_DUMMY_EVER	count of months client was ever in JPO PLACE		+	
PRI_MCI_UNIQ_AGE_20_24	Dummy if focus client's age 20<=age<=24 dummy if the individual is between the ages of 20 and 24		+	
PRI_MCI_UNIQ_AGE_25_29	dummy if focus client's age 25<=age<=29		+	
PRI_MCI_UNIQ_AGE_50_59_DUMMY_OA	number of adults where 50<=age<=59		+	
PRI_MCI_UNIQ_FEMALE_DUMMY_OA	Count of adults in the household that are female		+	
PRI_REF_POV_DUMMY_UNDER_10_OC	Count of children in a zip code with poverty rate less than 10		+	
PRI_REF_POV_DUMMY_UNMATCHED_OA	number of adults with unmatched Zipcode in Zipcode_poverty rate file		+	

Variable Name	**Variable Description**	MH Inpatient	Jail Booking	ER 4+ Visits
PRI_BH_MH_EMRGNCY_EVER_COUNT	count of days client was ever in MH EMERGENCY			+
PRI_PH_EVER_COUNT	count of physical health services focus client received in the past			+