



Maimonides Central Services Organization / Department of Population Health

Primary Data Analysis Report

Based on Results of Project “Achieving the Greatest Impact on Health and Cost Outcomes: A Focus on Reinvesting in Social Services”

Maimonides Central Services Organization, with support from New York State Health Foundation (NYSHealth)

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Table of Contents

Overview and Methodology	2
Study Design	2
Statistical Tests	3
Patient Cohort Descriptive Statistics	3
Results	4
Results for Six Intervention Receipt Cohorts.....	5
Results for Combined Intervention Receipt Cohort	6
Results for Full Patient Sample.....	7
Discussion	7
Interpretation of Findings	7
Limitations	8
Further Research Questions of Interest	8
Appendix. Measurement of Key Constructs.....	14

Overview and Methodology

This document summarizes the primary data analysis conducted for the “Achieving the Greatest Impact on Health and Cost Outcomes: A Focus on Reinvesting in Social Services” project, funded by the New York State Health Foundation. This document provides an overview of the methodology and results of the analysis¹.

The primary purpose of this analysis was to investigate the impact of receiving social services on healthcare utilization and cost outcomes. To identify the types of social services received (our analysis’ independent variables), we conducted a preliminary exploration of published literature and of Brooklyn Health Home (BHH) care management data, and consulted partner care management agencies about their experiences with connecting their patient populations with social services. From this, we identified six domains of social service: housing, food assistance, income assistance, legal services, peer support, and vocational training.

To identify the patient sample for the analysis, we randomly sampled 600 patients that met several inclusion criteria. Patient inclusion criteria were:

1. Medicaid members assigned to the Brooklyn Health Home for any point in 2014
2. At least nine months of care coordination during the year 2014
3. Care management progress notes in Brooklyn Health Home’s online care management platform indicating a demonstrated potential need in at least one of the identified six target social service domains.

After sample selection, we manually reviewed all care management progress notes for this 600 patient sample in order to determine patients’ need for and receipt of each of the six identified social services. The date of social service receipt was also recorded in order to isolate intervention receipt during 2014, the study intervention period. A team of four reviewers conducted the progress note review: the Health Foundation grant project manager, the Brooklyn Health Home analytics consultant, and two part time research assistant interns. The project manager led the review, determined the coding structure, and conducted regular inter-rater reliability checks.

From the progress note review, we identified cohorts of patients within the sample who received social service interventions during 2014; see Table 2 for cohort descriptions and sizes.

Study Design

A pre-post analysis was used to assess the impact of social services (and care management interventions) on healthcare utilization and cost outcomes. Utilization and cost data was compared between pre-intervention period (Medicaid claims data from 2013) and post-intervention period (Medicaid claims data from 2015). We conducted a pre-post analysis using eight cohorts: six intervention receipt cohorts (see Table 2), a cohort of patients who received any of the six interventions (see Table 2), and a cohort of all patients in the sample.

Four healthcare utilization indicators were included:

- (1) Number of ER visits
- (2) Number of inpatient admissions

¹ These conclusions are not those of the New York State Department of Health.

- (3) Number of patients with any ER utilization
- (4) Number of patients with any inpatient utilization

Two healthcare cost indicators were included:

- (1) Total cost to Medicaid of ER utilization
- (2) Total cost to Medicaid of inpatient utilization

We hypothesized that patients in receipt of any social service would experience a reduction in ER visits, inpatient admissions and cost post-intervention.

Statistical Tests

Nonparametric tests of statistical significance were used for the analyses because of the non-normal distribution of the dependent variables. The Wilcoxon signed-rank and McNemar tests were chosen for their ability to accurately analyze related samples, in this case pre- and post- intervention data for each patient cohort. The Wilcoxon signed-rank test for pre-post differences in continuous variables was used for number of ER visits and inpatient admissions and cost of ER visits and inpatient admissions, and the McNemar test for pre-post differences in binary variables was used for number of patients with any ER utilization and number of patients with any inpatient utilization.

The Wilcoxon signed-rank test pairs the pre- and post- intervention data for the same individual, determines the difference in results pre/post, ranks the individual's pre/post difference, sums the ranks of the positive shifts and sums the ranks of the negative shifts, and determines if, across the population, the rankings indicate a statistically significant shift in either direction between the pre- and post- periods. The McNemar test assesses whether the proportions of patients with and without a particular outcome (e.g. utilization of ER or inpatient services) in the pre-intervention period and the proportions of patients with and without that particular outcome in the post-intervention period differ significantly.

P values less than .05 were considered statistically significant. Statistical analysis was performed using IPython, part of the Anaconda version 3 package.

Patient Cohort Descriptive Statistics

The patient sample was split between men (54%; *n* = 324) and women (46%; *n* = 275). Because all Brooklyn Health Home patients are 18 or older, all patients in the sample were 18 or older during the intervention period. Most patients were between ages 18 and 64; 38% (*n* = 226) of the sample were ages 18-44, 54% (*n* = 323) were ages 45-64, and 8% (*n* = 50) were 65 or older during the intervention period. Approximately half the sample (51%; *n* = 305) were reported (per Medicaid claims) as Black, not Hispanic, and 29% of the sample (*n* = 173) was reported as White, not Hispanic. 7% of patients (*n* = 41) were reported as Hispanic, and 6% (*n* = 37) as "other." The majority of patients (75%; *n* = 450) resided in Kings County (Brooklyn).

Descriptive statistics about each intervention receipt cohort followed similar trends to statistics about the full patient sample. A smaller percentage of patients in the housing receipt cohort (56%) were reported as residing in Kings County (Brooklyn). Additionally, the level of severity of housing need identified among the majority of

patients in the housing receipt cohort was identified to be one of three categories: “unstable housing” (42%, n = 28), “living in shelter” (27%, n = 18), and “inadequate housing” (24%, n = 16). Four patients’ level of severity of housing need was identified as “not specified,” and no patients in the cohort were identified as “street homeless” or having “environmental health concerns.” (See Appendix for definitions of levels of severity of housing need used in the analysis.)

The types of interventions received in each social service domain were also identified from the progress note review, and the breakdown of intervention types is listed in Table 4.

Most patients in the cohort of any intervention receipt received just one intervention (83%; n = 127). A smaller number of patients received two or more interventions: 20 patients (13%) received two interventions, and 6 patients (4%) received three or four interventions. See Tables 3 and 4 for descriptive information about each cohort.

The prevalence of chronic conditions among the patient sample was identified using diagnosis codes from ER visit and inpatient admission claims. Among the full sample and most of the intervention receipt cohorts, hypertension was the most prevalent condition. 29% (n = 172) of the entire patient sample had a hypertension diagnosis from ER/inpatient utilization. See Tables 5 and 6 for a complete list of chronic conditions and prevalence estimates in each cohort.

Results

Our findings indicated reductions in ER and inpatient utilization and costs among patients in most of the social service intervention domains investigated. Table 1, below, presents an overview of results indicating reductions (positive impact) and increases (negative impact) in ER and inpatient utilization and cost outcomes among the intervention receipt cohorts. Results are discussed further below; see Tables 7 and 8 for complete results from the statistical analysis of ER and inpatient utilization and costs pre- and post- intervention period.

Table 1. Overview of Emergency Room and Inpatient Utilization and Cost Outcomes, Post- Intervention Period

Intervention Receipt Cohorts	Emergency Room			Inpatient		
	Visits	Members w/ Utilization	Cost	Admissions	Members w/ Utilization	Cost
Housing (n = 66)	△	△	△	△	△	△
Food Assistance (n = 35)	▽	△	▽	△	△	▲
Income Assistance (n = 27)	△	△	▽	△	△	△
Legal Service (n = 33)	△	△	▲	△	△	▲
Peer Support (n = 10)	▽	▽	▽	▽	▽	▽
Vocational Training (n = 15)	△	△	▽	▽	△	▽
Any Intervention (n = 153)	△	△	▼	▲	△	▲
All Patients (n = 599)	▲	△	▲	▲	△	▼

▲ Positive Impact – statistically significant △ Positive Impact – not statistically significant ▼ Negative Impact – statistically significant ▽ Negative Impact – not statistically significant

Results for Six Intervention Receipt Cohorts

The cohorts of patients who received each of the six social service interventions (housing: n = 66; food assistance: n = 35; income assistance: n = 27; legal service: n = 33; peer support: n = 10; vocational training: n = 15) were tested for statistically significant changes in utilization and cost outcomes using the statistical tests described above. A pre-post analysis including tests of significance indicated the following results:

- ER utilization
 - Number of ER visits: There were no statistically significant reductions in number of ER visits. The cohorts of patients who received a housing, income assistance, legal service, or vocation training intervention experienced reductions in number of ER visits that were not statistically significant. The food assistance and peer support intervention cohorts had no reductions in number of ER visits.
 - Patients with ER visits: There were no statistically significant reductions in number of patients with ER utilization. The cohorts of patients who received a housing, food assistance, income assistance, legal service, or vocational training intervention experienced reductions in number of patients with

ER utilization that were not statistically significant. Only the peer support intervention cohort had no reductions in number of patients with ER utilization.

- Inpatient utilization
 - Number of inpatient admissions: There were no statistically significant reductions in number of inpatient admissions. The cohorts of patients who received a housing, food assistance, income assistance, or legal service intervention experienced reductions in number of inpatient admissions that were not statistically significant. The peer support and vocational training intervention cohorts had no reductions in number of inpatient admissions.
 - Patients with inpatient admissions: There were no statistically significant reductions in number of patients with inpatient admissions. The cohorts of patients who received a housing, food assistance, income assistance, legal service, or vocational training intervention experienced reductions in number of patients with inpatient admissions that were not statistically significant. Only the peer support intervention cohort had no reductions in number of patients with inpatient admissions.
- ER costs
 - There was a statistically significant reduction in ER costs among patients in the legal service receipt cohort.
 - There were reductions in ER costs among patients in the housing receipt cohort that were not statistically significant.
- Inpatient costs
 - There were statistically significant reductions in inpatient costs among patients in the food assistance and legal service receipt cohorts.
 - There were reductions in inpatient costs among patients in the housing, food assistance, income assistance, and legal service receipt cohorts that were not statistically significant.

Results for Combined Intervention Receipt Cohort

The cohort of patients who received any social service intervention or interventions (n = 153) was also tested for statistically significant changes in utilization and cost outcomes. A pre-post analysis including tests of significance indicated:

- ER utilization
 - Number of ER visits: There were no statistically significant reductions in ER utilization.
 - Patients with ER visits: There were reductions in ER utilization that were not statistically significant.
- Inpatient utilization
 - Number of inpatient admissions: There was a statistically significant reduction in the number of inpatient admissions.
 - Patients with ER visits: There was a reduction in the number of patients with inpatient admissions that was not statistically significant.
- ER costs
 - There was a statistically significant *increase* in ER costs.
- Inpatient costs
 - There was a statistically significant reduction in inpatient costs.

Results for Full Patient Sample

The entire patient sample (n = 599), who were all enrolled for at least nine months during 2014 in BHH care management (regardless of social service receipt), were also tested for statistically significant changes in utilization and cost outcomes. A pre-post analysis including tests of significance indicated:

- ER utilization
 - Number of ER visits: There was a statistically significant reduction in number of ER visits.
 - Patients with ER visits: There was a reduction in the number of patients with ER visits that was not statistically significant.
- Inpatient utilization
 - Number of inpatient admissions: There was a statistically significant reduction in the number of inpatient admissions.
 - Patients with inpatient admissions: There was a reduction in the number of patients with inpatient admissions that was not statistically significant.
- ER costs
 - There was a statistically significant reduction in ER costs.
- Inpatient costs
 - There was a statistically significant *increase* in inpatient costs.

Discussion

Interpretation of Findings

The results of this primary analysis suggest some association between social service interventions and reduced healthcare utilization and costs among a population of patients engaged in consistent care management in Brooklyn. The lack of statistical significance in many of the reductions in utilization and cost observed among the social service intervention receipt cohorts could be due, at least in part, to the small sizes of the cohorts. Larger samples are needed in order to achieve results of statistical significance. However, despite this limitation, we consider our findings to provide useful preliminary information about social service receipt and its impact on healthcare utilization and cost outcomes for a population of high need patients engaged in care management in Brooklyn.

The statistical significance of the reductions in inpatient admissions and inpatient costs and the reductions (although not statistically significant) in ER visits and number of patients with ER utilization among patients who had received any of the social service interventions suggest that receipt of at least one of a variety of social services may be associated with a reduction in ER and inpatient utilization.

The statistical significance of the reductions in ER visits, ER costs, inpatient admissions, and inpatient costs and the reductions (although not statistically significant) in number of patients with ER utilization and number of patients with inpatient utilization among the entire patient sample, regardless of documented social service

receipt, suggests that continued engagement in Brooklyn Health Home care management services alone may be associated with a reduction in ER and inpatient utilization.

The statistically significant increase in ER costs among patients who had received any of the social service interventions and the statistically significant increase in inpatient costs among the entire patient sample should be further explored to better understand what factors may have driven these cost increases despite social service and care management intervention.

Limitations

The following limitations on the social service receipt data used in this analysis should be considered when interpreting results:

- Social services receipt data was abstracted through a qualitative review of care management progress notes, which are free-text (as opposed to containing structured data fields) and often difficult to code.
- There was limited follow-up data available, and information such as how long a patient remained housed or connected to a social service following initial service connection was often not available.
- Because the intervention period of the analysis encompassed all 12 months of 2014, the pre- and post-intervention measurement periods (2013 and 2015) did not always capture the precise 12-month period preceding and following the intervention.
- The cohort sizes were not large enough to bring in a control group, and as a result, we cannot compare trends in ER and inpatient utilization and cost among a population not engaged in care management and/or connected to social services.
- The patient sample size was limited due to challenges in abstracting free-text social service receipt data. The small sizes of the cohorts we investigated limited the statistical significance of the analyses, and in interpreting the findings, we are limited in how much we can extrapolate our findings to a larger population.

Further Research Questions of Interest

Although we encountered challenges and limitations in conducting the analysis, our findings offer useful guidance for continuing to investigate social service receipt's impact on healthcare utilization and cost. From our research process and results, we have identified the following topics for further exploration:

- Further qualitative analysis to glean context from patients' care management documentation that will help in better understanding the utilization trends observed in the data
- Nuances in the levels of severity of housing need among patients, which may have driven ER and inpatient utilization
- Total cost of care for the patient sample, including not only ER and inpatient utilization but also outpatient, primary care, pharmacy, and other types of health services
- Appropriate follow up interventions and quality improvement initiatives based on findings from the progress note review and utilization and cost analysis. For instance, given the high prevalence of hypertension across the patient sample identified, we will explore follow-up interventions to address this.

Table 2. Patient Cohorts Identified for Primary Data Analysis

Intervention Receipt Cohort	Number of Patients
Housing	66
Food assistance	35
Income assistance	27
Legal service	33
Peer support	10
Vocational training	15
Any intervention receipt*	153

* includes patients in the sample who received at least one of any of the six social service interventions

Table 3. Descriptive Statistics

	Total Patient Sample		Housing Receipt		Food Assistance Receipt		Income Assistance Receipt		Legal Services Receipt		Peer Support Receipt		Vocational Training Receipt		Any Intervention Receipt	
	n =	599	n =	66	n =	35	n =	27	n =	33	n =	10	n =	15	n =	153
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Gender																
Women	275	46%	39	59%	21	60%	15	56%	19	58%	4	40%	12	80%	86	56%
Men	324	54%	27	41%	14	40%	12	44%	14	42%	6	60%	3	20%	67	44%
Age*																
Age 18-44	226	38%	30	45%	10	29%	11	41%	7	21%	2	20%	9	60%	61	40%
Age 45-64	323	54%	33	50%	21	60%	16	59%	25	76%	4	40%	6	40%	82	54%
Age 65 and older	50	8%	3	5%	4	11%	0	0%	1	3%	4	40%	0	0%	10	7%
Race/Ethnicity																
Black, not Hispanic	305	51%	37	56%	15	43%	14	52%	19	58%	3	30%	7	47%	76	50%
White, not Hispanic	173	29%	18	27%	15	43%	10	37%	10	30%	5	50%	5	33%	53	35%
Hispanic	41	7%	4	6%	3	9%	1	4%	0	0%	0	0%	0	0%	7	5%
Other	37	6%	5	8%	1	3%	2	7%	2	6%	1	10%	0	0%	8	5%
Asian or Pacific Islander	17	3%	2	3%	0	0%	0	0%	1	3%	0	0%	1	7%	4	3%
Unknown	14	2%	0	0%	1	3%	0	0%	1	3%	0	0%	2	13%	4	3%
Native American or Alaskan Native	12	2%	0	0%	0	0%	0	0%	0	0%	1	10%	0	0%	1	1%
County of Residence**																
Kings (Brooklyn)	450	75%	37	56%	29	83%	22	81%	28	85%	7	70%	10	67%	111	73%
Bronx	56	9%	12	18%	1	3%	1	4%	0	0%	2	20%	3	20%	18	12%
New York (Manhattan)	45	8%	5	8%	2	6%	2	7%	1	3%	0	0%	1	7%	7	5%
Queens	29	5%	9	14%	1	3%	1	4%	1	3%	0	0%	0	0%	10	7%
NY State, Outside NYC	8	1%	2	3%	0	0%	1	4%	2	6%	1	10%	1	7%	4	3%
Staten Island	7	1%	1	2%	1	3%	0	0%	1	3%	0	0%	0	0%	2	1%
Outside NY State	4	1%	0	0%	1	3%	0	0%	0	0%	0	0%	0	0%	1	1%

* as of intervention period, 2014

** as of claims data pull, June 2017

Table 4. Descriptive Statistics, Continued

Housing Receipt Cohort, Level of Severity of Housing Need			Peer Support Receipt Cohort, Types of Services Received		
	n	%		n	%
Unstable housing	28	42%	Peer specialist	6	60%
Living in shelter	18	27%	Peer support group	2	20%
Inadequate housing	16	24%	Other	2	20%
Not specified	4	6%			
Street homeless	0	0%			
Environmental health concerns	0	0%			
Food Assistance Receipt Cohort, Types of Services Received			Vocational Training Receipt Cohort, Types of Services Received		
	n	%		n	%
SNAP/food stamps	19	54%	Education/job training	11	73%
Food delivery	6	17%	Employment support	4	27%
Food voucher	5	14%			
Food bank referral	4	11%			
Other	1	3%			
Income Assistance Receipt Cohort, Types of Services Received			Any Intervention Receipt Cohort, Number of Interventions Received		
	n	%		n	%
SSI/SSDI benefits	19	70%	1 intervention	127	83%
Other	8	30%	2 interventions	20	13%
			3 interventions	5	3%
Legal Service Receipt Cohort, Types of Services Received			4 interventions	1	1%
	n	%			
Assistance with legal documents	11	33%			
Legal supports for entitlements	6	18%			
Legal aid/appropriate legal representation	5	15%			
Immigration support	5	15%			
Other	4	12%			
Intimate partner violence support	2	6%			

Table 5. Prevalence of Chronic Conditions*

	Total Patient Sample		Housing Receipt		Food Assistance Receipt		Income Assistance Receipt		Legal Services Receipt		Peer Support Receipt		Vocational Training Receipt		Any Intervention Receipt	
	n =	599	n =	66	n =	35	n =	27	n =	33	n =	10	n =	15	n =	153
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Asthma	85	14%	7	11%	8	23%	7	26%	8	24%	0	0%	2	13%	24	16%
Behavioral Health	31	5%	3	5%	1	3%	1	4%	2	6%	0	0%	0	0%	7	5%
Cancer	31	5%	3	5%	1	3%	0	0%	2	6%	0	0%	1	7%	7	5%
Cerebrovascular Disease	59	10%	5	8%	2	6%	4	15%	5	15%	0	0%	1	7%	16	10%
Chronic Kidney Disease	25	4%	2	3%	2	6%	1	4%	5	15%	1	10%	0	0%	8	5%
Congestive Heart Failure	55	9%	4	6%	7	20%	2	7%	6	18%	1	10%	1	7%	18	12%
COPD	75	13%	6	9%	6	17%	5	19%	5	15%	0	0%	1	7%	17	11%
Coronary Heart Disease	86	14%	12	18%	8	23%	4	15%	7	21%	2	20%	1	7%	29	19%
Diabetes	95	16%	11	17%	7	20%	3	11%	9	27%	1	10%	4	27%	27	18%
HIV	36	6%	4	6%	0	0%	2	7%	2	6%	1	10%	2	13%	9	6%
Hypertension	172	29%	16	24%	12	34%	7	26%	14	42%	3	30%	5	33%	46	30%
Osteoarthritis	36	6%	3	5%	2	6%	2	7%	1	3%	1	10%	2	13%	9	6%
SMI	18	3%	1	2%	1	3%	1	4%	1	3%	0	0%	0	0%	3	2%
Substance Abuse	96	16%	11	17%	2	6%	3	11%	6	18%	3	30%	1	7%	21	14%

Table 6. Number of Chronic Conditions* Among Total Patient Sample

	none	1 chronic condition*	2 chronic conditions*	3 chronic conditions*	4 chronic conditions*	5 chronic conditions*	6 chronic conditions*	7 chronic conditions*	8 chronic conditions*	9 chronic conditions*
n	268	117	76	45	31	29	18	6	4	5
%	45%	20%	13%	8%	5%	5%	3%	1%	1%	1%

*Based on diagnoses codes on ER and inpatient claims between 2013 and 2015; ICD 9 and ICD 10 diagnoses were rolled up to create chronic condition categories listed above

Table 7. Emergency Room Utilization and Cost, Pre- and Post- Intervention Period

Intervention Receipt Cohorts	Number of Visits				Number of Patients with ER Utilization				Cost* of ER Utilization			
	Pre-(2013)	Post-(2015)	Reduction	Significance	Pre-(2013)	Post-(2015)	Reduction	Significance	Pre-(2013)	Post-(2015)	Reduction	Significance
Housing (n = 66)	135	125	reduction	n.s.	28	24	reduction	n.s.	\$13,042	\$6,947	reduction	n.s.
Food Assistance (n = 35)	59	63	-	n.s.	21	15	reduction	n.s.	\$4,377	\$4,967	-	n.s.
Income Assistance (n = 27)	53	42	reduction	n.s.	12	10	reduction	n.s.	\$5,110	\$21,332	-	n.s.
Legal Service (n = 33)	69	64	reduction	n.s.	19	15	reduction	n.s.	\$5,767	\$2,837	reduction	**
Peer Support (n = 10)	2	13	-	n/a	1	4	-	n/a	\$220	\$723	-	n.s., n/a
Vocational Training (n = 15)	30	29	reduction	n/a	10	7	reduction	n/a	\$1,587	\$1,759	-	n.s.
Any Intervention (n = 153)	301	275	reduction	n.s.	77	63	reduction	n.s.	\$26,110	\$36,466	-	**
All Patients (n = 599)	1,576	1,076	reduction	***	287	217	reduction	n.s.	\$206,170	\$118,421	reduction	***

Table 8. Inpatient Utilization and Cost, Pre- and Post- Intervention Period

Intervention Receipt Cohorts	Number of Inpatient Admissions				Number of Patients with Inpatient Utilization				Cost* of Inpatient Utilization			
	Pre-(2013)	Post-(2015)	Reduction	Significance	Pre-(2013)	Post-(2015)	Reduction	Significance	Pre-(2013)	Post-(2015)	Reduction	Significance
Housing (n = 66)	283	268	reduction	n.s.	18	10	reduction	n.s.	\$47,450	\$21,665	reduction	n.s.
Food Assistance (n = 35)	217	55	reduction	n.s.	15	4	reduction	n.s.	\$54,217	\$4,766	reduction	***
Income Assistance (n = 27)	97	36	reduction	n.s., n/a	9	6	reduction	n.s.	\$17,635	\$915	reduction	(***)
Legal Service (n = 33)	318	252	reduction	n.s., n/a	14	7	reduction	n.s.	\$51,284	\$16,700	reduction	**
Peer Support (n = 10)	1	22	-	n/a	1	4	-	n/a	\$44	\$7,592	-	n.s., n/a
Vocational Training (n = 15)	12	29	-	n/a	4	3	reduction	n/a	\$3,562	\$3,812	-	n.s., n/a
Any Intervention (n = 153)	818	480	reduction	***	52	27	reduction	n.s.	\$144,243	\$44,296	reduction	***
All Patients (n = 599)	3,486	2,324	reduction	***	189	116	reduction	n.s.	\$589,329	\$647,292	-	***

*Cost to Medicaid

**p<.05

***p<.01

(***)p<.01, but sample size too small for normal approximation

n.s. = not significant

n.s., n/a = not significant, and sample size too small for normal approximation

n/a = sample size too small for approximation

Appendix. Measurement of Key Constructs

Levels of Severity of Housing Need Abstracted from Care Management Progress Notes

In addition to housing need, the level of severity of the housing need was abstracted from care management progress notes. The following categories and definitions were used to identify the level of severity of housing need indicator:

Street homeless: Housing need was categorized as “street homeless” if progress notes indicated evidence of shelter refusal, unwilling to go to a shelter, or complete homelessness.

Living in shelter: Housing need was categorized as “living in shelter” if progress notes indicated evidence of a patient residing at a shelter.

Unstable housing: Housing need was categorized as “unstable housing” if progress notes indicated evidence of a patient being housed, but at risk of losing housing imminently due to eviction or a personal situation.

Inadequate housing: Housing need was categorized as “inadequate housing” if progress notes indicated evidence of a patient being housed, but with some aspect of the housing situation being inadequate, such as apartment maintenance or conditions or a personal situation with the other tenants.

Environmental health concerns: Housing need was categorized as “environmental health concerns” if progress notes indicated evidence of a patient being housed, but the housing environment presenting health concerns, such as mold, mildew, insect infestation, or other conditions that negatively impact health.

Not specified: Housing need was categorized as “not specified” if progress notes indicated a need for housing without any additional details about the nature of the housing need.

Chronic Conditions

Chronic conditions were identified based on a NYSDOH Medicaid Redesign Team Supportive Housing Evaluation² and based on Maimonides CSO internal clinical guidance, and were identified in the data using ICD-9 and ICD-10 codes in any position on an ER or inpatient claim, at any point during 2013 – 2015. Thus, diagnoses on non-ER/inpatient claims are not reflected in this analysis.

ER Utilization, Inpatient Utilization

² New York State Department of Health. (2017). Medicaid Redesign Team Supporting Housing Evaluation: Utilization Report 1. Retrieved from https://www.health.ny.gov/health_care/medicaid/redesign/2017/docs/2017-05_utilization_rpt.pdf

³ New York State Department of Health. (2017). Medicaid Redesign Team Supporting Housing Evaluation: Cost Report 1. Retrieved from https://www.health.ny.gov/health_care/medicaid/redesign/2017/docs/2017-05_cost_rpt.pdf

ER utilization: Medicaid claims with place of service code 23

Inpatient utilization: Medicaid claims with place of service code 21

ER Costs, Inpatient Costs

ER costs: Total Fee for Service and Managed Care Organization paid amounts for claims with place of service code 23

Inpatient costs: Total Fee for Service and Managed Care Organization paid amounts for claims with place of service code 21