THE HEALTH RESILIENCE PROGRAM

A PROGRAM ASSESSMENT

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HRP EVALUATION

EXECUTIVE SUMMARY: KEY FINDINGS ON THE HEALTH RESILIENCE PROGRAM

PURPOSE OF THE STUDY

This report describes findings from a descriptive evaluation of the Health Resilience Program (HRP) conducted by the Center for Outcomes Research & Education (CORE). The HRP's goal is to engage high-need, high-risk patients to alter their utilization patterns and reduce the total cost of care while maintaining or improving access and quality. The study was designed to assess program influence on healthcare utilization, costs, quality, and to help the program identify areas of optimal impact and opportunities to refine its approach.

DATA & METHODS

We used a combination of claims data and self-reported surveys to assess key outcomes for HRP participants. Using claims, we compared clients' utilization and expenditure patterns in before and after engagement in the program. Using surveys, we also asked patients about their health care access, quality, and well-being at baseline and following engagement with the HRP. Finally, we performed an optimal impact analysis to understand which types of HRP patients had stronger or weaker outcomes than average.

KEY QUESTIONS & FINDINGS

DID HRP PARTICIPANTS CHANGE HEALTH CARE UTILIZATION AFTER ENROLLING?

YES. After enrolling, HRP participants used fewer ED visits and had fewer non-OB inpatient events. While acute care visits went down post-engagement, primary care visits increased, suggesting better connections to these types of outpatient care.

See page 5

Average percent change in visits per member per year:

ED	IP	PCP
-22%	-19%	+28%
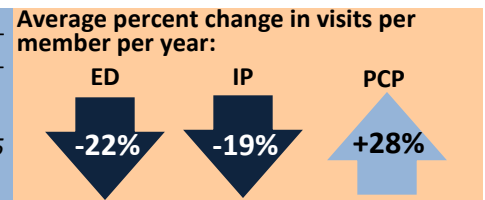
WERE OVERALL MEDICAL EXPENDITURES LOWER AFTER ENROLLING?

YES. Overall medical expenditures decreased significantly for HRP participants in the year after their enrollment. On average, expenditures were $208 per month lower after enrolling than they had been before, equating to a difference of $1.65 million in annual savings across the 660 patients in the study. Expenditure changes mapped to shifts in utilization, with acute care expenditures down and primary care expenditures up.

See page 6

Estimated yearly expenditure difference:

| HRP N=660	X	EXPENDITURE DIFFERENCE -$208/month X 12 months	=	YEARLY CHANGE -$1.65 million

DID ACCESS AND QUALITY STAY THE SAME OR GET BETTER?

YES. HRP participants were more likely to report that all of their health care needs were being met and were more satisfied with their health care after experiencing the HRP program compared to baseline assessments taken when they entered the program.

See pages 9-10

Survey results compared to baseline:

Highly satisfied with care	Received all needed care
+12%	+22%
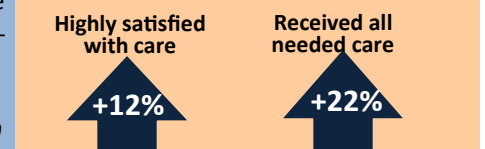
THE BOTTOM LINE

The Health Resilience Program's goals are to improve connection to primary and outpatient care and reduce use of acute care in order to reduce total expenditures while maintaining or improving access to and quality of care. In this descriptive study, the year following enrollment was characterized by those very things: fewer ED and inpatient events, more use of primary care, and significantly lower total expenditures than in the year prior to enrollment. Importantly, these changes were accompanied by better subjective client ratings of access and quality. Because this study was descriptive, further research is needed to rigorously compare the experiences of participants to those of similar patients who do not enroll in HRP.

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INTRODUCTION

This report summarizes findings from an assessment of the Health Resilience Program (HRP) in Oregon. Conducted at the Providence Center for Outcomes Research & Education (CORE), the study describes health care utilization, health care costs, self-reported outcomes, and optimal program impacts.

BACKGROUND

In 2011, CareOregon launched HRP in three clinics to address the bio-psychosocial needs of Medicaid's and Medicare's most high-risk/high-utilizer patients. With funding from CMMI's Health Commons Grant, HRP was scaled up and expanded to a total of 16 primary care clinics and one specialty care clinic. HRP embedded *Health Resilience Specialists* into participating clinics with the intent of targeting high acuity, high need patients with psychosocial, mental, physical, or systems barriers to achieving better outcomes. The program's key goals are to develop meaningful partnerships with enrolled patients to better meet their health care needs while reducing inappropriate utilization and reducing total costs of care.

CONTEXT

Research suggests that just 5% of the population may account for nearly 50% of total health care costs.[1] Multiple studies have revealed that these "high utilizers" of care represent patients with complex bio-psychosocial needs, including high burden of chronic physical/ mental health conditions and detrimental social determinants of health that are not easily met by the traditional health care system.[2-4] Addressing the complex needs of these high utilizers has become an important focus of recent health policy initiatives designed to spur quality improvement and reduce the overall cost of care.

The HRP is an intervention that targets the most high-need and medically complex patients to provide multidisciplinary support aimed at overcoming psychosocial and systemic barriers to health and reducing unnecessary utilization and costs while not compromising access to or quality of care. In this report, we assess the success of the HRP program in meeting these aims by describing utilization patterns, medical costs, optimal impacts, and self-reported health outcomes for HRP clients.

CONTENTS

OBJECTIVES

1. Describe HRP patient utilization and expenditures.	2. Analyze the optimal impact of the HRP program to determine what predicts program success.	3. Evaluate the change in self-reported health and well-being for HRP pateints.
Using claims data, we assessed any changes in utilization patterns and expenditures following engagement with HRP compared to prior.	We analyzed variation in outcomes among participants to determine which types of patients had better or worse outcomes than average within the program.	We analyzed survey data from patients, collected at baseline and program completion, to evaluate changes in self-reported access and care quality, as well as overall health and well-being.

References
1. Agency for Healthcare Research and Quality. The high concentration of U.S. health care expenditures. Researh in Action. Available at: http://meps.ahrq.gov/mepsweb/data_files/publication/ra19/ra19.pdf
2. Matzer F, Wisiak UV, Graninger M, et al. Biopsychosocial health care needs at the emergency room: challenge of complexity. PLoS One. 2012;7(8):e141775.
3. Byrne M, Murphy AW, Plunkett PK, et al. Frequent attenders to an emergency department: a study of primary health care use, medical profile, and psychosocial characteristics. Ann Emerg Med. 2003; 41: 309-318.
4. Mercer T, Bae J, Kipnes J, et al. The highest utilizers of care: individualized care plans to coordinate care, improve healthcare service utilization, and reduce costs at an academic tertiary care center. J Hosp Med. 2015; 10(7): 419-424.

METHODOLOGY

DATA SOURCES		
PROGRAM DATA: These records are maintained by the program and were used to identify HRP clients, their date of first engagement with the program, and their Dual status.	**HSO CLAIMS DATA:** This data, maintained by CORE, contains comprehensive healthcare utilization and costs for all Health Share members on Medicaid. Extracted claims included data up to January 2015.	**DUALS CLAIMS DATA:** We requested from CareOregon all Medicare claims for Dual individuals in the study up to January 2015. Utilization and costs for Duals were derived from combining this data with CORE's HSO claims data.

OVERVIEW

We used a retrospective, pre-post, longitudinal cohort design to assess the HRP. We evaluated utilization and costs for key care domains, including ED, non-obstetric inpatient, outpatient (OP) behavioral health, and primary care. We computed the rates of events and expenditures occurring in the 12 months prior to HRP enrollment and compared them to rates computed for a 12-month period post-enrollment (Exhibit 1).

This was a descriptive, pre-post study — our results do not include a comparison group. Further research will be needed to contextualize these findings against the experiences of similar patients who did not enroll in the program.

STUDY DESIGN

POPULATION: A total of 878 HRP clients were eligible for analysis: all adult Medicaid-only or Dual (Medicaid/Medicare) Health Share members who engaged with HRP between September 2012 and June 2014 (Exhibit 1). Individuals with less than 6 months of coverage in the year prior to enrolling in HRP, and those with less than 6 months of coverage at post-enrollment were excluded (Exhibit 2); thus ensuring sufficient data at baseline and follow-up for estimating outcomes. The final panel included 564 Medicaid-only and 95 Dual-eligible individuals.

PRE & POST PERIODS: Each participant received an index date determined by their earliest date of enrollment with the HRP. We assessed changes in healthcare use and costs by comparing events occurring in the 12 months prior to enrollment to those in the 12 months after enrollment. The three months immediately after enrollment was censored to reflect the program's start-up time with a new client (Exhibit 1).

DATA: HRP program data was used to identify study participants, define their index date, and determine their insurance status. Information on demographics, participation in other CMMI interventions, and diagnoses were derived from claims files. We computed healthcare usage in per-member-per-year (PMPY) and costs in per-member-per-month (PMPM) from a dataset we constructed that combined Medicaid-only claims from CORE with Medicare claims from CareOregon.

EXHIBIT 1. STUDY TIME PERIOD

FIRST ENROLLED IN Sep. 2012 – June 2014

PRE: 12 MONTHS PRIOR TO ENROLLMENT | 3-MOS. CENSORED | POST: 12 MONTHS FOLLOWING THE CENSORED PERIOD, ENDING JAN. 2015

EXHIBIT 2. STUDY PARTICIPANTS

N= 878 — Adults age 18+, first engaged between September 2012 and June 2014.

Excluded those with <6 mos. coverage at either pre-enrollment (n= 77) or post-enrollment (n= 142)

N= 659

N= 564 MEDICAID ONLY

N= 95 DUALS

STATISTICAL ANLAYSES

PRE VS. POST COMPARISONS: To determine meaningful differences in outcomes before and after enrollment with HRP, we used paired t-tests to compare average utilization and costs, McNemar's test to compare the probability of having at least one visit. We employed the Wilcoxon Rank-Sum test to compare median expenditures before and after enrollment. Due to the large variations seen in expenditures, we censored outliers whose absolute cost change was at or above three standard deviations from the mean change from our analyses of average costs. Statistical significance was determined using p-value ≤ 0.10.

OUTCOMES MODELING: In the optimal impact analysis, multivariate regression models were used to identify the most important predictors of having a successful outcome (defined as a reduction in ED or inpatient events compared to the baseline period). Multivariate regression analysis allows us to assess the influence of multiple explanatory factors on the outcome, while controlling for variations in demographics, health status, and participation in other CMMI programs. Statistical significance was determined using p-value ≤ 0.10.
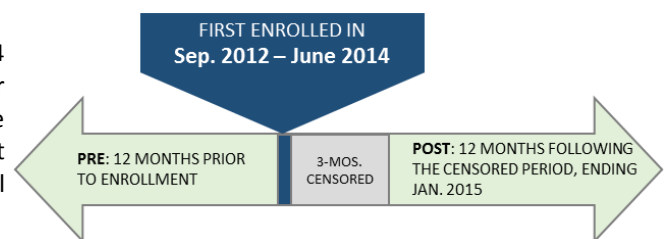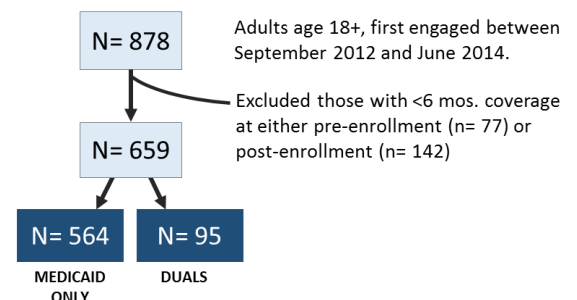
PROGRAM SUMMARY

PROGRAM OVERVIEW

The HRP currently serves 16 primary care clinics and one specialty clinic in Oregon. The HRP program embeds Health Resilience Specialist (HRS) into these clinics where they connect with high-needs, high-risk patients to help them overcome barriers to health.

HRP PATIENT
• Established in a clinic where HRS are embedded
• Medicaid as primary insurance through Health Share
• Willing and able to make changes in their lives
• Has modifiable, high utilization patterns such as:
∗ ≥1 non-OB inpatient admissions with or without ED visits within 12 months, OR
∗ ≥6 ED visits with or without inpatient admission within 12 months.

HEALTH RESILIENCE SPECIALISTS
• Extensive outreach experience
• Mental health/addiction training
• Strong understanding of trauma dynamics
• Ability to work across cultures
• Working knowledge of local services and resources

The Health Resilience Specialists are unique members of the health care workforce with specific expertise and skills used to work with the complex HRP patients. Once a patient has engaged with the HRP, the HRS works with the patient to meet their personal health needs and to meet the program goals of reducing unnecessary medical care usage and reducing overall expenditures. When meeting with HRP patients, specialists work on communications skills, healthy behavior, self-advocacy, and planning for the future. They provide information to further empower and engage the patient in their own health management, including topics such as health literacy, prescription adherence, and available social services.

WHO ARE THE HRP CLIENTS?

A total of 564 Medicaid-only and 95 Dual-eligible Medicaid/Medicare HRP patients were included in this descriptive study (Exhibit 3). Most (7 in 10) met the program's criteria for "high utilizer" described above; the remainder did not meet the utilization criteria but may have qualified for other reasons.

HRP patients are significantly more medically complex than typical Medicaid patients, with high rates of physical and behavioral health conditions and significantly higher expected expenditures, based on their medical profile, than typical Medicaid members. Prior to enrolling in HRP, the typical Medicaid member's medical profile suggests expected expenditures 3 times higher than those of a typical Medicaid member; among Dual-eligible expected expenditures are 3.5 times higher than average.

HRP patients are also complex in other ways we can't measure as easily. Most participants enter the program facing strong psychosocial or social determinants of health challenges that are not systematically captured in traditional health care data. These factors may magnify the already significant differences in medical risk.

PROVIDENCE MEDICAL GROUP COHORT: Only 5% of this study's participants were part of Providence Medical Group (PMG), mostly due to the program's later start on enrollment within PMG locations relative to our study window. As enrollment increases, future studies will be better positioned to include a specific assessment of PMG patients.

EXHIBIT 3. DEMOGRAPHICS		Medicaid N=564	Duals N=95
General	Age (years)	45	58
	Female	72%	67%
Race/ Ethnicity	White, non-Hispanic	62%	69%
	Black/African-American	26%	18%
	Hispanic	5%	5%
	Other	7%	7%
County of Residence	Multnomah	72%	75%
	Washington	16%	13%
	Clackamas	12%	13%
High Utilizer	Pre-HRP: Had 6+ ED or 1+ inpatient visit	74%	70%
Other CMMI Interventions	Tier 1 (light touch)	22%	28%
	Tier 2 (heavy touch)	16%	15%
PMG	Providence Medical Group	5%	0%
Rate Category	Blind & Disabled	NA	62%
	Old Age Assistance	NA	38%
General Health (PH: physical health; BH: behavioral health)	Average CDPS Risk Score	3.0	3.5
	Average # PH conditions	2.9	3.9
	Average # BH conditions	1.4	1.1
	No PH, no BH conditions	5%	<1%
	No PH, some BH	7%	4%
	Some PH, no BH	32%	38%
	Has PH and BH conditions	56%	57%

PROGRAM SUMMARY

RATES OF DIAGNOSES

We evaluated the prevalence of physical and behavioral health diagnoses for all HRP patients (Medicaid only and Medicaid/Medicare Duals) relative to typical Health Share adult members (Exhibits 4A and 4B). In every case across the conditions we measured, prevalence was significantly higher among HRP patients compared to the typical Medicaid population.

PHYSICAL HEALTH: The most prevalent condition for HRP participants is hypertension (67%), followed by asthma (44%) and diabetes (39%). Chronic heart failure (CHF) is present at 15 times the typical Medicaid member rate; and chronic bronchitis, liver disease, chronic obstructive pulmonary disease (COPD), and emphysema are present at approximately 8-9 times the typical rate. All of the remaining conditions including obesity, diabetes, asthma, chronic ischemic heart disease (CIHD), and hypertension were 3 to 5 times as prevalent in HRP patients compared to typical Medicaid adults.

BEHAVIORAL HEALTH: Affective disorder was the most common behavioral health condition (47%), followed by depression (35%). Chemical dependency and non-organic psychosis were present at 8.5 and 6.5 times, respectively, the typical adult Medicaid member rates. The remaining disorders, including paranoid states, psychotic disorder, depression, and affective disorder were 2-4 times the typical rates.

EXHIBIT 4A. PHYSICAL HEALTH CONDITIONS

Legend:
- % Typical Adult Medicaid Member
- % HRP participants

Condition	% Typical Adult Medicaid Member	% HRP participants
Emphysema	<1%	8%
CHF	1%	15%
CIHD	3%	16%
Chronic Bronchitis	2%	19%
Liver Disease	3%	24%
COPD	3%	26%
Obesity	12%	34%
Diabetes	10%	39%
Asthma	9%	44%
Hypertension	20%	67%
None	64%	10%

EXHIBIT 4B. BEHAVIORAL HEALTH CONDITIONS

Legend:
- % Typical Adult Medicaid Member
- % HRP participants

Condition	% Typical Adult Medicaid Member	% HRP participants
Paranoid States	<1%	2%
Psychotic Disorder	3%	11%
Non-Organic Psychosis	2%	13%
Chemical Dependency	2%	17%
Depression	10%	35%
Affective Disorder	13%	47%
None	83%	37%

BOTTOM LINE

HRP patients carry heavy health burden. All of the measured physical and behavioral health conditions were present at much greater rates in the HRP patients compared to the typical adult Medicaid member. This aligns with the program's goal of selecting the most vulnerable and complex patients.
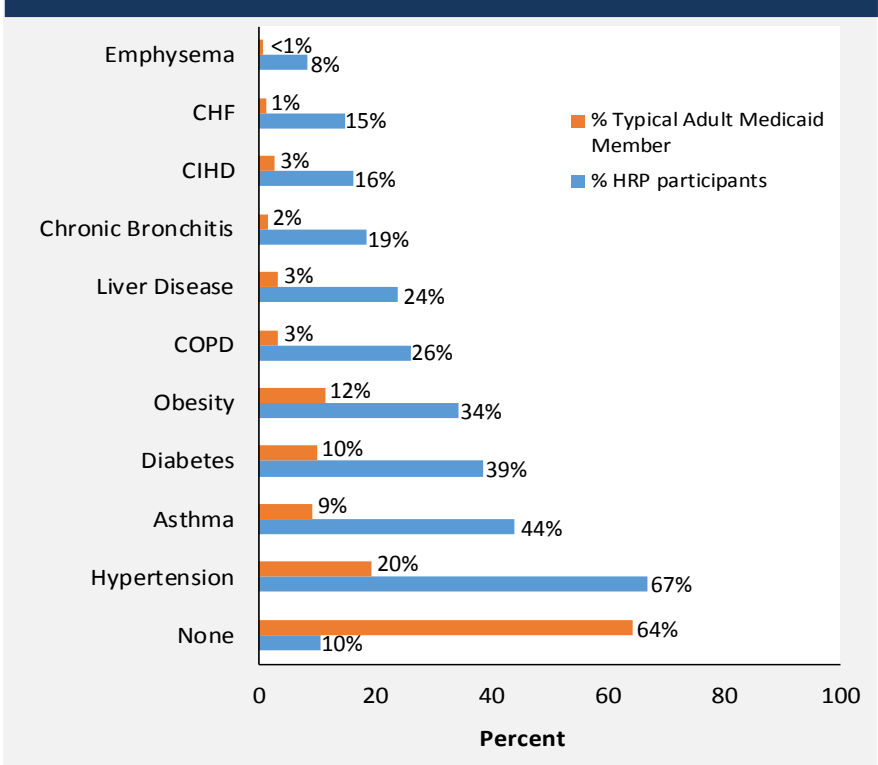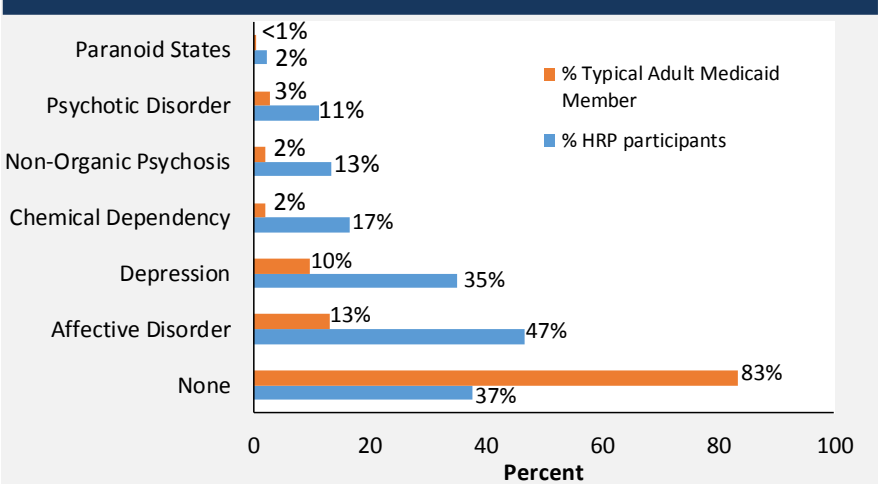
OUTCOMES:
UTILIZATION OF CARE

WHAT DID WE STUDY?

We wanted to determine whether HRP clients used more outpatient care and less acute and inpatient care after enrolling in the program. Using claims data, we assessed utilization in four key domains of care: ED and non-obstetric inpatient visits, which the program tries to avoid, and primary care and outpatient (OP) behavioral health visits, to which the program typically works to connect clients. We compared the likelihood of having a visit of each type and the average rate of utilization per member-year of coverage before and after HRP enrollment.

OUTCOME MEASURES

ANY VISIT: Percent of individuals that had at least one visit in the period 12 months following engagement compared to prior.

AVERAGE VISITS: The average number visits by domain of care per member per year (PMPY).

RESULTS

ANY VISIT: We limited our analysis of the probability of having at least one of each type of visit to individuals that had continuous coverage during the entire 12 months pre and post HRP program to ensure that all individuals had equal coverage in the pre/post period. We found that the probability of having at least one ED visit fell significantly in the 12 months after program enrollment compared to the 12 months before, as did the percent of patients with at least one inpatient event (Exhibit 5). The likelihood of using outpatient services remained stable. Nearly all patients were already connected to primary care at baseline, suggesting that there were very few "new connections" to make among participants, although there were significant increases in the prevalence of primary care visits overall and for Medicaid only members.

EXHIBIT 5. PERCENT OF PARTICIPANTS WITH AT LEAST ONE VISIT IN 12 MONTHS

	ALL (N= 416)				MEDICAID-ONLY (N= 329)				DUAL-ELIGIBLE (N= 87)			
TYPE OF VISIT:	Pre	Post	Δ	p-value[1]	Pre	Post	Δ	p-value[1]	Pre	Post	Δ	p-value[1]
ED	90%	78%	-12%	**<.0001**	92%	82%	-10%	**<.0001**	83%	62%	-21%	**0.001**
Inpatient (non-OB)	49%	37%	-13%	**<.0001**	48%	37%	-10%	**0.002**	55%	33%	-22%	**0.003**
OP Behav. Health	28%	32%	4%	0.097	30%	34%	4%	0.154	21%	24%	3%	0.549
Primary Care	90%	95%	5%	**0.003**	87%	94%	7%	**0.001**	100%	99%	-1%	--

AVERAGE VISITS: We found that the total rate of ED and inpatient visits per member year was significantly lower after enrollment than before: rates of ED use were 22% lower, and rates of inpatient care were 19% lower (Exhibit 6). At the same time, rates of primary care use increased significantly (28% higher than in the year before enrollment). This, combined with the finding from Exhibit 5 above, suggests that although few new connections to primary care were made, participants engaged more often with their primary care providers after engagement.

EXHIBIT 6. AVERAGE UTILIZATION (Per Member Year)

	ALL (N= 659)				MEDICAID-ONLY (N= 564)				DUAL-ELIGIBLE (N= 95)			
	Pre	Post	%Δ	p-value[2]	Pre	Post	%Δ	p-value[2]	Pre	Post	%Δ	p-value[2]
ED	6.4	5.0	-22%	**<.0001**	6.7	5.1	-23%	**<.0001**	5.1	4.4	-14%	0.22
Inpatient (non-OB)	1.03	0.83	-19%	**0.006**	1.03	0.81	-21%	**0.004**	1.0	0.94	-6%	0.77
OP Behav. Health	4.8	5.6	16%	0.30	4.9	5.7	16%	0.33	4.2	4.7	13%	0.73
Primary Care	8.1	10.4	28%	**<.0001**	7.5	9.6	28%	**<.0001**	12.1	15.3	26%	0.05

Bold denotes significance at p<0.05 | 1: p-value from McNemar's test; 2: p-value from paired t-test

Tables for utilization outcomes containing complete average, min, max, and median data can be found in the Appendix.

BOTTOM LINE

Following HRP engagement, study participants used more primary care, and significantly less ED and inpatient care, than in the year prior to engagement. The pre versus post change was greatest in the Medicaid only group and least among Dual-eligible clients. These results are descriptive and thus not contextualized against a comparison group, but are also directionally consistent with the program's stated goals of increasing one type of care (outpatient connections) while reducing another (acute care utilization).

EXPENDITURES

WHAT DID WE STUDY?

We examined changes in total health care expenditures among the HRP participants before and after program enrollment. We used claims data to calculate and compare average and median health care expenditures per member per month (PMPM) before and after engagement, in total and for several key domains of care.

RESULTS

We found that expenditures for HRP participants were, on average, $208 per member per month lower after HRP enrollment than compared to prior (Exhibit 7). Dual participants had a larger reduction than Medicaid-only; however, due to the small sample size among Duals, we did not have sufficient statistical power to detect statistical significance. Overall, total cost reductions were primary driven by declines in ED and inpatient expenditures; OP behavioral health, primary care, and pharmacy expenditures were mostly steady.   These results align well with the patterns observed in the utilization data, suggesting that expenditure changes likely originated from fewer services utilized rather than changes in the price of those services.

Median total costs before and after HRP enrollment significantly decreased by $330 per month, indicating a strong downward shift in the distribution of expenditures across the study population.

OUTCOME MEASURES
Average Expenditures: The mean total in allowed costs from Health Share claims in each category of care.
Median Expenditures: If all clients were ranked in order of total expenditures from lowest to highest, this expenditure would be exactly in the middle of the distribution. This measure is more robust to the presence of outlier values (such as a single, very expensive member) than the mean, and is useful for assessing the distribution of expenditures.

EXHIBIT 7. EXPENDITURES (PMPM)

	ALL				MEDICAID-ONLY				DUAL-ELIGIBLE			
	Pre	Post	Δ (Post-Pre)	p-value	Pre	Post	Δ (Post-Pre)	p-value	Pre	Post	Δ (Post-Pre)	p-value
Average Total Cost[1]	$2,219	$2,011	-$208	**0.004**	$1,951	$1,761	-$190	**0.002**	$3,771	$3,460	-$311	0.350
ED	$338	$234	-$104		$305	$211	-$93		$533	$367	-$165	
Inpatient (non-OB)	$700	$582	-$118		$613	$520	-$93		$1,206	$939	-$266	
OP Behav. Health	$70	$91	$21		$68	$94	$26		$81	$74	-$7	
Primary Care	$59	$73	$14		$54	$66	$12		$87	$116	$30	
Pharmacy	$443	$416	-$27		$408	$373	-$35		$648	$668	$20	
Median Total Cost[2]	$1,486	$1,156	-$330	**0.0004**	$1,337	$1,045	-$292	**0.002**	$2,591	$2,239	-$352	0.372

Bold denotes statistical significance at p<0.05 | 1. p-value from paired t-test; 2. p-value from Wilcoxon Rank-Sum test

TOTAL MAGNITUDE OF DIFFERENCE IN EXPENDITURES: We computed the total difference in annual expenditures for the 660 persons in our study population (Exhibit 8). Results suggest that total expenditures for our 660 participants were $1.65 million lower in the post-enrollment year than in the pre-enrollment year.

Tables with cost outcomes containing complete average, min, max, and median data can be found in the Appendix.

EXHIBIT 8. PRE/POST EXPENDITURE DIFFERENCE

HRP PARTICPANTS	DIFFERENCE IN EXPENDITURES	YEARLY CHANGE
ALL N=660	X -$208/month X 12 months =	-$1.65 million
Medicaid N=564	X -$190/month X 12 months =	-$1.29 million
Duals N=95	X -$311/month X 12 months =	-$355K

BOTTOM LINE

Total expenditures for HRP participants were significantly lower post-enrollment than in the year prior to enrollment; this result was mostly driven by reductions in ED and inpatient expenditures, with primary care, pharmacy, and outpatient behavioral health expenditures remaining roughly the same. These results are descriptive and thus not contextualized against a comparison group, but are also directionally consistent with the program's stated goals of maintaining or improving connections to outpatient care while reducing expenses associated with acute care.

OUTCOMES:
OPTIMAL IMPACT ANALYSIS

WHAT TYPES OF CLIENTS HAD THE BEST OUTCOMES?

No program works the same for all clients, and we wanted to understand the key drivers of success among HRP participants. We defined "successful outcome" as having experience a reduction in total ED or inpatient use compared to the year prior to enrollment. Multivariate regression analysis was used to build statistical models that identified the best predictors of a successful outcome. Results are presented as an odds ratio (OR) indicating the odds of experiencing a successful outcome: ORs above 1 indicate an *increased odds of success*, while ORs below 1 indicate a *decreased odds of success.* The ORs presented in these models summarize the influence of each listed factor on successful outcomes while holding constant the influence of all other factors in the model, allowing for an assessment of which factors "matter most" as drivers of program success.

SUCCESSFUL ED OUTCOMES: HRP had the least success reducing ED visits for participants with highly complex medical profiles: those with five or more physical health conditions or three of more behavioral health conditions (Exhibit 9). In contrast, the program was most successful reducing ED visits among participants who used more ED care at baseline.

SUCCESSFUL INPATIENT OUTCOMES: As with ED visits, we found that HRP had the least success reducing inpatient visits for participants with many physical health conditions (Exhibit 10). Those with higher baseline inpatient use had greater reductions than their counterparts after enrollment. Hispanic participants had significantly reduces odds of having had a reduction in IP visits, suggesting potential cultural barriers to success.

The optimal impacts analysis relies on information that is captured in the claims data, including demographics, baseline use and costs, and diagnoses. We were unable to account for other factors that may influence an individual's response to the HRP program, such as their social, economic, and environmental challenges and support. We suggest chart review or additional data collection on these characteristics to better understand the HRP program's impact on specific subgroups.

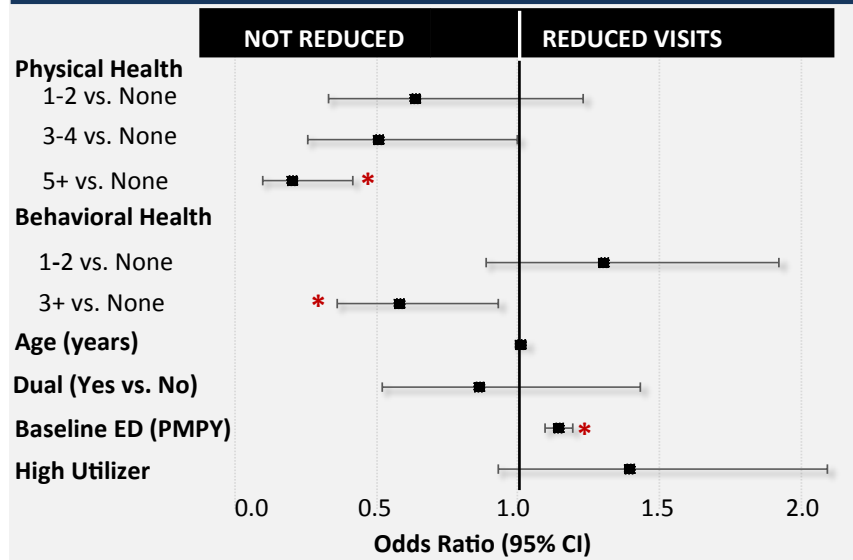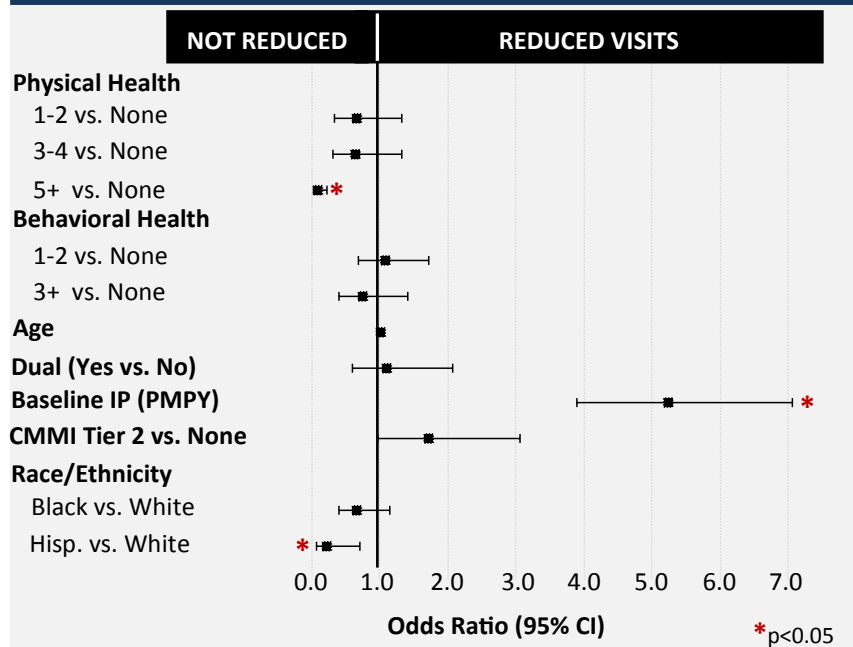### EXHIBIT 9. ODDS OF HAVING REDUCED ED VISITS

EXHIBIT 10. ODDS OF HAVING REDUCED IP VISITS

*p<0.05

BOTTOM LINE

HRP clients with high medical complexity were less likely than their counterparts to achieve successful reductions in ED and inpatient use. Those with high baseline utilization were more likely to have had a reduction; however, this may represent typical regression to the mean. Additional data collection, such as chart review, may shed light on additional key contributors to successful cases that is not captured in the current claims data.

OUTCOMES:
CLIENT-REPORTED DATA

WHAT WE WANTED TO KNOW

We wanted to assess whether the program was accomplishing its goal of reducing overall costs of care while maintaining or improving access and quality. We sent participants baseline surveys (T0) designed to capture their pre-enrollment health and health care experiences at the time of their enrollment, then surveyed them again as they were exiting the HRP program (T1). A final follow-up survey was sent six months after completion of the program (T2).

Surveys were designed to assess care access and quality, self-reported health outcomes, satisfaction with the HRP program experience, and other measures of interest. We received 256 responses for the baseline survey, 100 for the exit survey, and 57 for the six month post-exit survey. Response rates ranged from 31% to 35% (Exhibit 11). It is important to note that this was not a longitudinal survey design, respondents from each time period may have varied.

RESULTS

IMPROVED ACCESS & QUALITY: HRP participants that responded to the baseline survey (T0) were already well connected to care (Exhibit 12), with most already reporting having a usual place of care and a personal provider. The program had little room to improve these measures from baseline. However, the survey respondents in the follow-up period were more likely to report receiving all needed health care, and were more likely to report "high" satisfaction with the overall quality of their health care.

BETTER SUBJECTIVE HEALTH: Survey respondents after completing the program reported higher subjective health on the SF-12 instrument, a scale designed to assess health-related quality of life (Exhibit 13). They were also more likely to report that their health was either stable or improving (vs. declining) compared to six months ago, a measure of their "health trajectory." We did not see evidence of improved patient engagement (as measured by the Patient Activation Measure index) or significant changes in other self-reported outcomes.

PROGRAM SATISFACTION: Participants generally reported strong satisfaction with their experience in HRP (Exhibit 14).

EXHIBIT 11. SURVEY RESPONSE RATES

Baseline (T0)	At Program Exit (T1)	Post-Exit (T2)
N= 256 (34%)	N= 100 (35%)	N= 57 (31%)

EXHIBIT 12. ACCESS & QUALITY

	T0	T1	T2
Had some kind of health insurance in past 6 months	99%	98%	100%
Has a usual place to go for medical care	94%	96%	98%
Has one person, or a team of people, they consider as personal health care provider	91%	95%	93%
Always/sometimes experienced difficulty getting help for medical needs in past 6 months	67%	59%	64%
Received all needed care	35%	58%*	47%
Highly satisfied with overall health care	69%	80%*	75%

EXHIBIT 13. OTHER OUTCOMES

	T0	T1	T2
Same or better health status compared to previous 6 months	54%	71%*	65%
% reporting medium to high self-sufficiency score (PAM)	56%	59%	53%
% with high medical adherence	58%	64%	53%
Average self-reported physical health on 0-100 scale (higher better)	33.7	36.1	35.2
Average self-reported mental health score on 0-100 scale (higher better)	37.5	39.9	37.1
% screened positive for depression	48%	42%	51%

*p<0.05 compared to baseline

EXHIBIT 14. EXPERIENCE WITH HEALTH RESILIENCE SPECIALIST

	N	Avg.[1]	% Agree[2]
My HRS understood my needs	94	3.5	93%
My HRS helped me set personal health goals	93	3.2	84%
My HRS was there to help me when I needed	93	3.4	89%
Overall rating of my HRS (1-5 excellent)	93	4.3	NA

1. Average on a 1-to-4 scale where 1= strongly disagree, 4= strongly agree.

2. Percent that "strongly agree" or "agree"

CONCLUSIONS

PROGRAM & STUDY GOALS

The Health Resilience Program was built to provide multidisciplinary support for high-need, high-utilizer patients who face significant medical and psychosocial barriers to health. The program's goals are to connect such patients to appropriate outpatient and community supports, reduce acute care utilization, and lower overall health care expenditures while maintaining or improving the quality of care.

We use a pre-post design to assess the HRP's success in meeting its goals. This is a descriptive study; there is no comparison group against which to contextualize our findings. However, we can still assess whether HRP is seeing trends that are consistent with its stated program goals and mechanisms of action. Future research will yield valuable additional insights as the HRP cohort is compared to outcomes for similar, non-enrolled patients.

PROGRAM IMPACTS

UTILIZATION: We found that HRP clients used significantly less ED and inpatient care after enrolling than they did in the year prior to enrolling. We also found that they used significantly more primary care services. These results are consistent with the program's intent, which is to increase connection to and use of outpatient services and decrease ED and inpatient use.

EXPENDITURES: HRP participants had significantly lower average and median expenditures in the year after engaging with the program: $208 and $330 less per member-month, respectively, compared to the year before enrolling. Lower expenditures were limited to ED and inpatient expenditures; costs for primary care, pharmacy, and outpatient behavioral health remained largely stable after enrollment. This result is consistent with program goals, though our study lacks a comparison group against which savings estimated could be objectively calibrated.

There were about 660 persons included in our study; a subset of the program's total enrollment. Within our study population, total expenditures were $1.65 million less in 12 months post-enrollment than in the year prior to enrollment.

OPTIMAL IMPACT ANALYSIS: Outcomes were not the same for all types of HRP clients. The program generally had the best success with clients who were higher utilizers at baseline, and had the most trouble achieving success with clients who had very complex medical profiles. Particular chronic conditions (cardiovascular and chemical dependency, for example) proved especially challenging to address.

CLIENT-REPORTED OUTCOMES: HRP clients reported better access to needed care and higher subjective ratings of care quality after enrolling in the program. They also reported better subjective health and high satisfaction with the program's staff. These results suggest that HRP's effort to reduce expenditures did not come at the expense of clients' ability to get high quality care when they needed it; indeed, HRP participation served to enhance clients' overall health care experience.

IMPLICATIONS

HRP's goals are to help clients get the care they need, but also to help them get it in an efficient way that reduces overall costs. We found that total expenditures were substantially lower after enrollment, and those reductions were almost entirely driven by less use of acute care (ED and inpatient). At the same time, clients reported better access to and quality of care. These findings are consistent with the program's stated goals and its theoretical mechanisms of action.

Compared to the year before they enrolled, the 660 persons in our study cost a total of $1.65 million less to care for in the year after enrollment. While a more rigorous design is necessary to formally calculate program return-on-investment (ROI), these results are at least suggestive that further investigation to quantify total program savings relative to program costs might be warranted.

LIMITATIONS

This was an observational, descriptive study that assessed changes in outcomes for a group of individuals before and after an intervention took place. The lack of a comparison group makes it unclear whether the results were specifically due to the HRP program itself, or if the changes represent natural changes in utilization and costs that might have occurred even in the absence of an intervention. Further research is needed to allow these results to be contextualized against the experience of a similar group of patients who did not enroll in HRP.

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APPENDIX

The tables below describe the average, range, and median utilization per member per year for each domain of care. The results are shown for all HRP participants and are broken down by Medicaid only and Dual eligible participants.

EXHIBIT 15. UTILIZATION (AVERAGE, RANGE, MEDIAN) PER MEMBER PER YEAR

ALL (N= 659)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	6.4	0-91	5.0	5.0	0-59	2.0
INPATIENT (NON-OB)	1.03	0-11	0.0	0.83	0-24	0.0
OP BEH. HEALTH	4.8	0-203	0.0	5.6	0-218	0.0
PRIM CARE	8.1	0-78	6.0	10.4	0-128	7.6

MEDICAID ONLY (N= 564)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	6.7	0-91	5.0	5.1	0-59	2.2
INPATIENT (NON-OB)	1.03	0-11	0.0	0.81	0-24	0.0
OP BEH. HEALTH	4.9	0-203	0.0	5.7	0-218	0.0
PRIM CARE	7.5	0-63	6.0	9.6	0-62	7.0

DUAL-ELIGIBLE (N= 95)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	5.1	0-38	2.0	4.4	0-40	2.0
INPATIENT (NON-OB)	1.00	0-6	1.0	0.94	0-10.5	0.0
OP BEH. HEALTH	4.2	0-95	0.0	4.7	0-106.9	0.0
PRIM CARE	12.1	0-78	9.0	15.3	0-128	9.0

APPENDIX

The tables below describe the average, range, and median medical expenditures per member per month for each domain of care. The results are shown for all HRP participants and are broken down by Medicaid only and Dual eligible participants.

EXHIBIT 16. MEDICAL EXPENDITURES (AVERAGE, RANGE, MEDIAN) PER MEMBER PER MONTH

ALL (N= 659)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	$338	$0-5,792	$203	$234	$0-2,722	$104
INPATIENT (NON-OB)	$700	$0-9,820	$124	$582	$0-10,227	$28
OP BEH. HEALTH	$70	$0-1,254	$0	$91	$0-2,974	$0
PRIM CARE	$59	$0-333	$ 45	$73	$0-738	$52
PHARMACY	$443	$0-9,776	$157	$416	$0-9,054	$158
TOTAL	$2,219	$0-30,894	$1,486	$2,011	$0-30,206	$1,156

MEDICAID ONLY (N= 564)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	$305	$0-4,290	$191	$211	$0-2,722	$104
INPATIENT (NON-OB)	$613	$0-6,388	$84	$520	$0-10,180	$23
OP BEH. HEALTH	$68	$0-1,254	$0	$94	$0-2,974	$0
PRIM CARE	$54	$0-332	$42	$66	$0-482	$47
PHARMACY	$408	$0-9,776	$139	$373	$0-9,054	$128
TOTAL	$1,951	$0-30,893	$1,337	$1,761	$0-30,206	$1,045

DUAL-ELIGIBLE (N= 95)						
	PRE			POST		
	AVERAGE	RANGE	MEDIAN	AVERAGE	RANGE	MEDIAN
ED	$533	$ 0-5,792	$289	$367	$0-2,125	$113
INPATIENT (NON-OB)	$1,206	$0-9,820	$675	$939	$0-10,227	$72
OP BEH. HEALTH	$81	$0-880	$0	$74	$0-874	$0
PRIM CARE	$87	$0-288	$72	$116	$0-740	$87
PHARMACY	$648	$0-6,234	$333	$668	$0-6,187	$374
TOTAL	$3,771	$0-16,695	$2,591	$3,460	$0-18,932	$2,239