Dignity Health 2MATCH Final Report

September 2020

Assessing the effectiveness of the 2MATCH Project on social determinants of health and healthcare utilization

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Introduction

This report presents preliminary findings using data collected from the current evaluation period, September 2019 to September 2020. The primary focus of this report is to summarize current data that are meaningful and applicable to the 2MATCH project. This report primarily outlines descriptive analyses, and an additional section highlights differences in health-related social needs (HRSNs) by participants' characteristics including: age, gender, race, ethnicity, income, and household size. Identification of HRSNs are central to goals of the 2MATCH program and this report; based, in part, on these HRSNs, participants are also categorized into three "risk" groups:

- No Risk: participants who indicated zero emergency department (ED) visits in the past 12 months and reported no HRSNs
- Low Risk: participants who indicated zero or one ED visit in the past 12 months and reported one or more HRSNs
- High Risk: participants who visited the ED two or more times in the past 12 months and reported one or more HRSNs

Evaluation Implementation

Dignity Health obtained funding from CMS (5/1/2017 to 4/30/2022) to develop and implement the To MATCH, Align Through Community Hubs (2MATCH) program to screen Medicare and Medicaid beneficiaries seeking health services for unmet HRSNs and to connect them with appropriate services in the community through an IT solution combined with patient advocates. In September 2018, as part of the Dignity/ASU Strategic Initiatives research program, Dignity Health and the ASU Southwest Interdisciplinary Research Center (SIRC), Office of Evaluation and Partner Contracts began their evaluation of the 2MATCH Align through community hubs initiative. The milestones of the 2MATCH Project are listed in Table 1.

Table 1 Project Presentations and Reports September 2019 - September 2020

Date	Meeting Purpose
9/23/2019	Annual Report Submitted
10/10/2019	Arizona Health Equity Conference 2019 presentation
11/13/2019	American Evaluation Association Conference 2019: 2 presentations
12/20/2019	Quarterly Report Submitted
3/20/2020	2MATCH Advisory Board presentation (Gap Analysis)
3/31/2020	Quarterly Report Submitted
4/30/2020	Annual Gap Analysis Report Submitted
6/10/2020	Quality Improvement Plan Submitted
6/30/2020	Quarterly Report Submitted
08/17/2020	Update Report Submitted
9/24/2020	Annual Report Submitted

Several primary deliverables and objectives were completed by SIRC during the current evaluation period. The annual Gap Analysis report required by the CMS Accountable Health Communities cooperative agreement was submitted to the 2MATCH Advisory Board on April 30, 2020. The aim of the Gap Analysis was to evaluate the current provision of services against community needs to better understand areas for improvement. SIRC also contributed data and provided consultation for the annual Quality Improvement (QI) plan, which was presented to the 2MATCH Advisory Board on June 10, 2020. Multiple conference proposals for this project were submitted and presented to local and national conferences. In addition, the previously developed data transfer plan and method for data sharing were sustained throughout staffing changes at both SIRC and Dignity Health. Currently, de-identified data for this project are transferred to SIRC on a weekly basis. This facilitates a continuous flow of data that can be managed by the SIRC team for the 2MATCH program.

Also during this year, the Covid-19 pandemic began and dramatically changed how and when care was delivered within St. Joseph's Hospital and Medical Center and the partner clinics implementing 2MATCH. Many patients deferred in-person appointments rather than risk exposure to the COVID-19 virus, and individuals who frequently utilized the emergency room as a safety net due to their lack of access to primary care also avoided seeking care rather than risk becoming exposed to the virus. In order to decrease the risk of transmitting the virus to either patients or health care workers, elective surgeries were cancelled and/or postponed and in-person appointments were replaced for the most part with telephonic appointments. Since early March, prior to Arizona's stay-at-home order going into effect, the 2MATCH Advocates and Advocate Supervisor employees began teleworking, and all beneficiary screening and navigation activities were conducted telephonically. This resulted in a decrease in the number of surveys that were completed as well as the identification of high-risk beneficiaries.

Geographic Target Area

The 2MATCH geographic target area (GTA) originally included 13 zip codes:
> 85003, 85004, 85006, 85007, 85008, 85009, 85015, 85017, 85019, 85031, 85033, 85035 & 85040

The GTA was expanded beginning on January 8, 2020 to include 22 additional high-need zip codes in Maricopa County:
> 85013, 85014, 85016, 85018, 85020, 85021, 85022, 85029, 85032, 85034, 85037, 85041, 85042, 85043, 85051, 85301, 85302, 85335, 85339, 85345, 85353, & 85363

Unless otherwise noted, all data presented in this report are based on the 13 zip codes in the original GTA for screenings that occurred prior to January 2020 and on the 35 zip codes in the expanded GTA for screenings that took place during or after January 2020. Data were also collected from participants from non-target zip codes, and these findings are also included to demonstrate relevant differences between target and non-target zip codes. Screening counts for each of the targeted zip codes are presented in Table 2 and depicted in Figure 1. Appendix 1 outlines the frequency of screenings from zip codes outside of the 2MATCH Program.

Table 2 Targeted Zip Code Screenings

Zip Code	Count	Zip Code	Count
85009	453	85021	80
85007	436	85042	75
85015	351	85051	72
85017	234	85004	67
85041	191	85016	55
85008	177	85043	46
85040	165	85029	41
85019	139	85018	37
85003	136	85020	36
85031	131	85037	34
85035	125	85032	32
85006	121	85302	22
85033	109	85022	20
85013	108	85345	20
85014	87	85034	17
85339	83	85353	17
85301	82	85335	6
		Total	**3,805**

Figure 1 Map Depicting Screening Counts by GTA Zip Code

Potential Variations in Screening and Navigation Counts

The data presented in this annual report may vary from information in previous quarterly reports for several reasons. First, a conservative method for duplicate case identification was used in this report, with any case having a duplicate beneficiary ID being removed from the analysis. Second, unless otherwise noted, this report is limited to participants from the original and expanded zip codes as explained previously. Finally, some participants did not provide data for all questions asked, so sub-group counts may not sum to the total counts provided elsewhere in the report.

HRSN Screening Tool

Data regarding HRSNs were collected during screenings using the HRSN Screening Tool. This instrument as well as information about the instrument background are included in Appendix 2.

Screenings

Screening Count Trends and Location

Analyses in this report used data collected from September 1, 2020 to August 28, 2020. There were 4,179 screenings completed during this period, in which zip codes targeted by the 2MATCH Program comprised a total of 3,805 (91%) of all screenings. Table 3 shows monthly screening totals for the targeted zip codes as well as all represented zip codes.
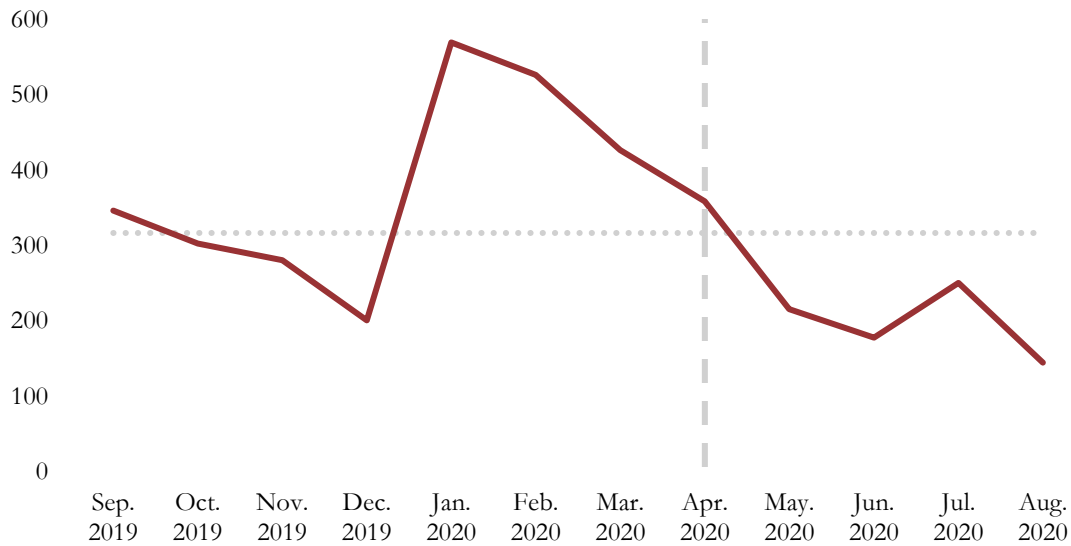
Table 3 Screening Counts by Month

Month	GTA	All Zip Codes	% from GTA
September 2019	347	390	89%
October 2019	303	371	82%
November 2019	281	332	85%
December 2019	201	231	87%
January 2020	570	597	95%
February 2020	527	569	93%
March 2020	427	445	96%
April 2020	359	384	93%
May 2020	216	233	93%
June 2020	178	203	88%
July 2020	251	265	95%
August 2020	145	159	91%
Total	**3,805**	**4,179**	91%

Note. This table displays screenings beginning September 1, 2019 and ending August 28, 2020.

Figure 2 shows the trend of screenings from the GTA during this period. January 2020 had the most screenings (570) and August 2020 had the fewest (145). Overall, the screening rate has been trending downward since January, during which time the COVID-19 pandemic has been ongoing. In particular, Arizona Governor Doug Ducey issued Executive Order 2020-18[1], which instituted a statewide "Stay home, Stay healthy, Stay connected" policy on March 31, 2020 and was in effect until May 15, 2020. Additionally, of note, data from August were incomplete at the time of this report, so additional screenings for the remainder of August will be reported at later date.

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[1] https://azgovernor.gov/sites/default/files/eo_2020-18_stay_home_stay_healthy_stay_connected_1_sw.pdf

Figure 2 Screening Counts from GTA by Month

Note. The dotted horizontal line represents average monthly screenings. The dashed vertical line represents the implementation of Executive Order 2020-18.

During this period, St. Joseph's Hospital & Medical Center Emergency Department had the highest number of screenings with 1,273 screenings from the GTA. Table 4 shows the screening counts for each medical center.
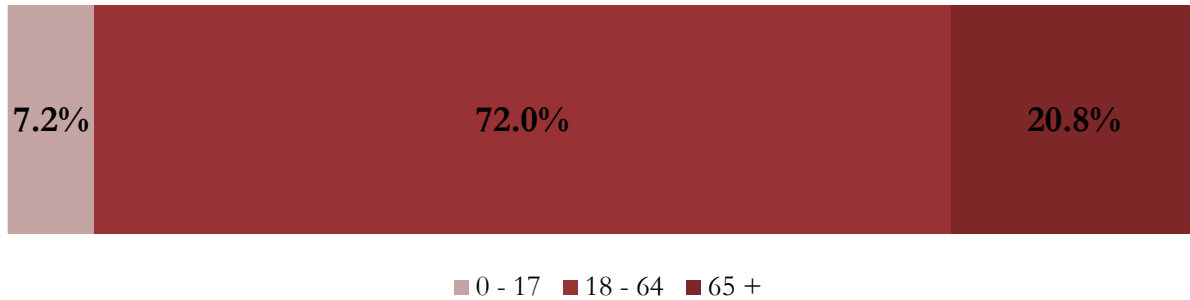
Table 4 Screenings Counts by Medical Center

Medical Center	# Screenings	%
St. Joseph's Hospital & Medical Center Emergency Department	1,273	33.5%
St. Joseph's Hospital & Medical Center Inpatient	1,086	28.5%
MIHS 7th Ave Family Health Center	609	16.0%
St. Joseph's Hospital & Medical Center Family Medicine Clinic	356	9.4%
Dignity St. Joseph's Hospital and Medical Center Internal Medicine	269	7.1%
Native American Connections Behavioral Health Services	194	5.1%
St. Joseph's Pediatrics	16	0.4%
Parsons Family Health Center at Circle the City	2	0.1%
Total	**3,805**	

Demographic Characteristics from Screenings

Age

Figure 3 shows the age distribution for the 3,805 individuals from the GTA who provided their birthdate for the 2MATCH screening. The majority of individuals were ages 18 to 64 years old, with 72% of individuals in that age range. Of the remaining individuals from the GTA, 20.8% were 65 years old or older, and 7.2% were younger than 18 years old.

Figure 3 Age Distribution of Individuals Screened from GTA

7.2%	72.0%	20.8%

■ 0 - 17 ■ 18 - 64 ■ 65 +

Gender

The majority of the 3,654 individuals who reported their gender on the 2MATCH screening identified as female (64%), the remaining 36% identified as male.

Race and Ethnicity

Race

More than half of the individuals screened from the GTA identified their race as *White* (58.1%), and 17.9% identified their race as *Other*. Participants were able to select more than one applicable race, and Table 6 illustrates the totals for each selection.

Table 5 Race of Individuals Screened from GTA

Race	# Screenings	%
White	1,873	58.1%
Other	578	17.9%
Black or African American	517	16.0%
American Indian or Alaska Native	181	5.6%
Asian	66	2.0%
Native Hawaiian or other Pacific Islander	11	0.3%
Total	**3,226**	

Ethnicity: Hispanic, Latino, or Spanish Origin

Slightly more than half of the individuals screened for the 2MATCH program from the GTA identified as Hispanic, Latino(a) or of Spanish origin. Participants were able to select more than one applicable ethnic group, and Table 5 illustrates the totals for each selection.
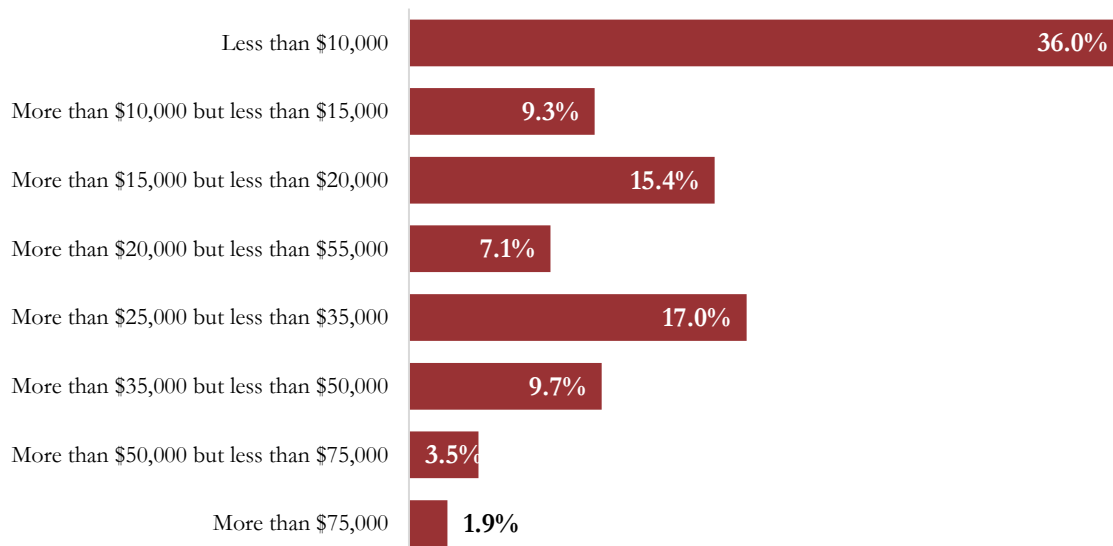
Table 6 Ethnicity (Hispanic, Latino, or Spanish Origin) of Individuals Screened from GTA

Ethnicity	# Screenings	%
Yes, Mexican, Mexican American, Chicano	1,247	36.3%
Yes, Another Hispanic, Latino, or Spanish origin	461	13.4%
Yes, Puerto Rican	21	0.6%
Yes, Cuban	14	0.4%
No, not of Hispanic, Latino, or Spanish Origin	1,694	49.3%
Total	**3,437**	

Income

Individuals were also asked on the HRSN screening tool to report an estimate of their annual household income from all current financial sources, and 2,482 individuals provided a response to this question. Figure 4 provides the household income for individuals from the GTA. Over a third of individuals reported an income of $10,000 or less (36%), and only 1.9% reported an income of $75,000 or more.
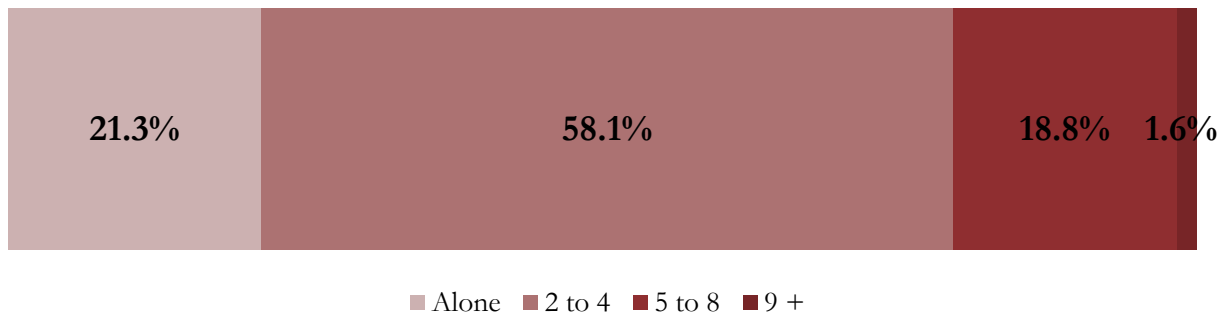
Figure 4 Income of Individuals Screened from GTA

Income Category	Percentage
Less than $10,000	36.0%
More than $10,000 but less than $15,000	9.3%
More than $15,000 but less than $20,000	15.4%
More than $20,000 but less than $55,000	7.1%
More than $25,000 but less than $35,000	17.0%
More than $35,000 but less than $50,000	9.7%
More than $50,000 but less than $75,000	3.5%
More than $75,000	1.9%

Household Size

As a part of the screening, participants were asked "*How many people do you currently live with?*" to collect information about household size. There were 3,297 individuals who provided a response to this question. Participants were asked to count the number of adults (including themselves), children and other dependents living in the household. The most common responses were living with one other person (21.6%) or alone (21.3%). More than half of individuals (58.1%) lived in a household of two to four people, and 18.8% lived in a household of five to eight people. Only 1.6% of individuals lived in households of 9 or more people. The average household size was around three individuals.

Figure 5 Household Size of Individuals Screened from GTA

21.3%	58.1%	18.8%	1.6%

■ Alone   ■ 2 to 4   ■ 5 to 8   ■ 9 +
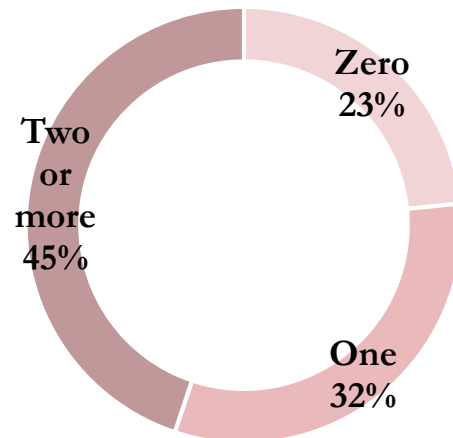
Health Related Social Needs from Screenings

Individuals who were screened were asked about their use of the ED and specific HRSNs, which were used to determine their risk levels.

ED Visits

Individuals were asked to indicate their past-year ED visits: "*How many times have you received care in an emergency room (ER) over the last 12 months?*"

The majority (76.6%) of individuals who were screened from the GTA reported having received care in an ED in the past 12 months. More than half of the individuals who had been to the ED in the past year visited two or more times.
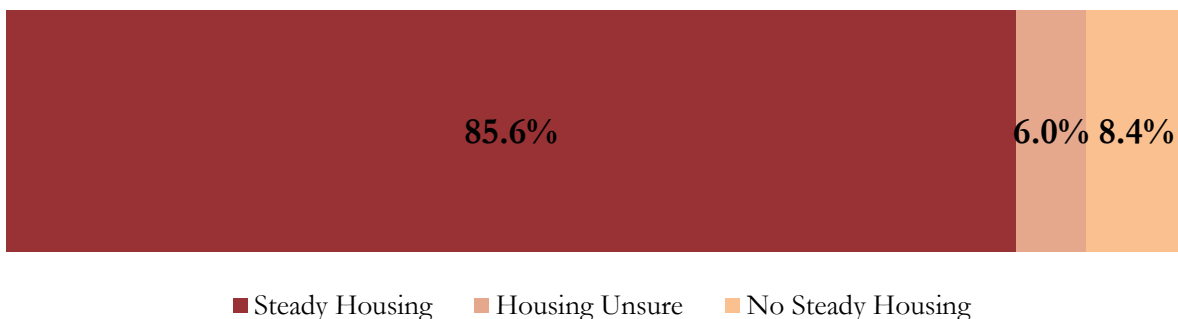
Figure 6 Past Year ED Visits

Zero
23%

Two or more
45%

One
32%

Housing

Individuals were also asked about housing stability: "*What is your living situation?*" Individuals were classified as *Steady Housing, Housing Unsure,* or *No Steady Housing* based on their responses:

1. *Steady Housing*: "I have a steady place to live"
2. *Housing Unsure*: "I have a place to live today, but **I am worried** about losing it in the future"
3. *No Steady Housing*: "I do not have a steady place to live (I am temporarily staying with others, in a hotel, in a shelter, living outside on the street, on a beach, in a car, abandoned building, bus or train station, or in a park)"

Of the individuals screened from the GTA, 6% indicated they had unsure housing and 8.4% indicated they had no steady housing, with the remainder indicating they had steady housing.

Figure 7 Housing Stability

85.6%	6.0%	8.4%

■ Steady Housing   ■ Housing Unsure   ■ No Steady Housing

In addition to collecting information about housing stability, individuals were asked to identify specific issues related to their current living situation.

The majority of participants (91.9%) indicated they did not have any of the specific housing issues listed in Table 7, and the remaining 8.1% selected at least one housing need. Table 7 lists the number of instances of each type housing-related issue. Individuals were able to select more than one housing issue.

Table 7 Specific Types of Housing Issues

Housing issue	Number of Instances	%
Pests, such as bugs, ants, or mice	106	3.0%
Water leaks	57	1.6%
Mold	39	1.1%
Smoke detectors missing or not working	31	0.9%
Lack of heat	23	0.6%
Oven or stove not working	19	0.5%
Lead paint or pipes	17	0.5%
None of the above	3,294	91.9%
Total	**3,586**	

Utilities

Another area of interest was utility affordability. Participants were asked "*In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home?*" A total of 3,536 individuals provided a response to this question. The majority of participants (90.1%) reported no threats to have their utilities cut off by a utility company. However, 9.2% of individuals had received a notice that their utilities would be shut off, and 0.7% reported their utilities were already shut off.
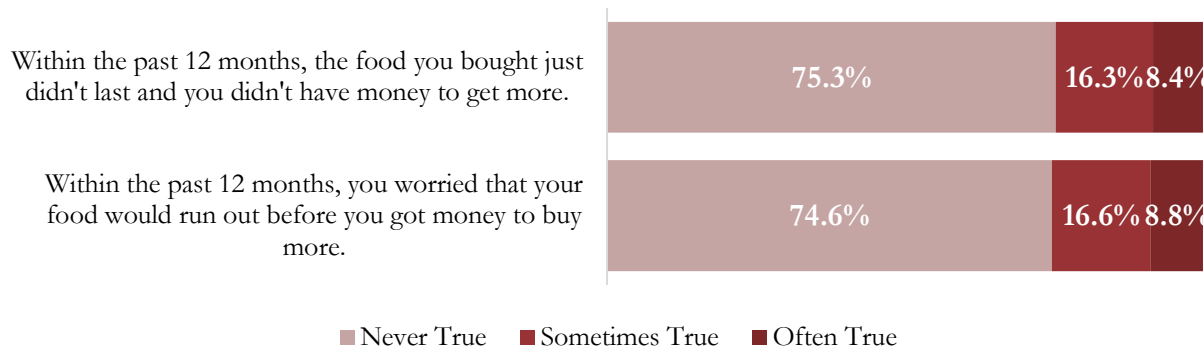
9.9% reported receiving a notice their utilities would be shut off or actually having their utilities shut off in the previous year.

Food

Individuals were asked to respond to two statements regarding food security on the HRSN Screening Tool, which asked individuals about their food running out and worrying about food running out. When asked if the food they had purchased did not last in the previous year, 25.4% of the 3,560 individuals who provided a response shared this was "*sometimes true*" or "*often true.*" Additionally, when asked about worrying about food running out in the past year, 24.7% of the 3,552 individuals who responded indicated this was "*sometimes true*" or "*often true.*"

Figure 8 Food Security

| Within the past 12 months, the food you bought just didn't last and you didn't have money to get more. | 75.3% | 16.3% | 8.4% |
| Within the past 12 months, you worried that your food would run out before you got money to buy more. | 74.6% | 16.6% | 8.8% |

■ Never True ■ Sometimes True ■ Often True

Transportation

Individuals were asked about access to reliable transportation by the following question: "*In the past 12 months, has lack of reliable transportation kept you from medical appointments, meetings, work or from getting to things needed for daily living?*" A total of 3,552 individuals from the GTA provided a response, and 17.3% of these individuals indicated the lack of reliable transportation as a barrier to getting to things they needed for daily living.

17.3%

missed an appointment, meeting or work due to lacking reliable transportation

Safety

Individuals were also asked about their safety and exposure to violence. The majority of individuals indicated that they never experienced any of the four safety issues. However, 9.6% of participants indicated that someone insulted or talked down to them and 8.5% reported being screamed or cursed at. Physical violence and threatening were reported less frequently, with 3.5% and 3.4% of individuals, respectively, reporting these experiences. Table 8 summarizes individuals' responses to these safety questions.
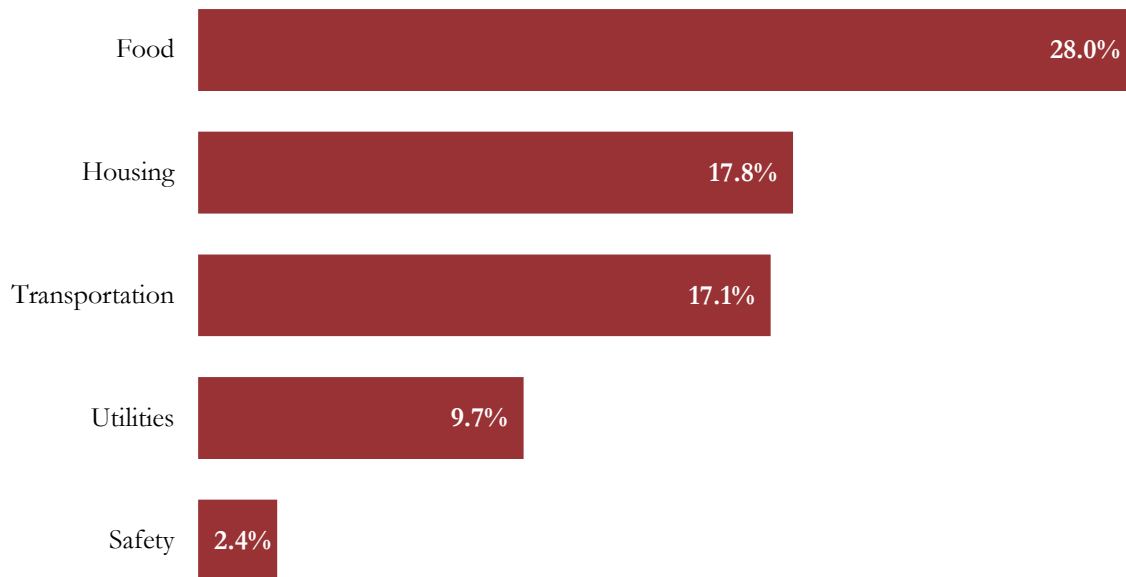
Table 8 Safety Issues

Safety Issue	Never	Rarely	Sometimes	Fairly often	Frequently
How often does anyone, including family and friends, insult or talk down to you?	90.4%	3.5%	3.5%	1.2%	1.3%
How often does anyone, including family and friends, scream or curse at you?	91.5%	3.5%	2.6%	1.4%	1.0%
How often does anyone, including family and friends, threaten you with harm?	96.5%	1.4%	1.2%	0.6%	0.3%
How often does anyone, including family and friends, physically hurt you?	96.6%	1.6%	1.1%	0.4%	0.3%

Positive Screenings

Based on participant responses to the screening questions outlined in Appendix 2, it was determined if an individual screened "positive" for a HRSN. Food was the most frequently identified need among those screened for the 2MATCH program. Food insecurity was the most prevalent HSRN, with 28% of individuals from the GTA screening positive, followed by 17.8% screening positive for housing instability, 17.1% for transportation issues, and 9.7% for utility issues. Safety was the least prevalent positive screening at 2.4%. Figure 9 shows the rates of positive screenings for each domain.

Figure 9 Positive Screenings

Qualification for 2MATCH Program

Based on responses from 3,805 individuals screened for participation in the 2MATCH program from the GTA, a total of 1,548 individuals or 40.7% were categorized as *high risk*. A total of 760 individuals or 20% who were screened as *low risk*.

Risk, ED Visits, and HRSNs by Participant Characteristics

Additional analyses were conducted to determine differences in risk levels, ED utilization, and HRSNs by participant characteristics. One-way analyses of variance (ANOVA) were conducted to assess differences in age by risk level, independent samples *t*-tests were conducted to test differences in age by ED utilization and HRSNs, and chi-square tests of independence were conducted to test the association between gender, race, ethnicity, income, and household size and risk level, ED utilization, and HRSNs. The results from each set of these analyses as well as descriptive differences between groups are summarized below.

Differences in Risk Levels by Participant Characteristics

In these data, risk level is a proxy for HRSNs, which contribute to health disparities. Risk levels were measured using three categories: *no risk* (39.3%), *low risk* (20%) and *high risk* (40.7%). As outlined in the introduction, participants who did not utilize the ED in the past 12 months and reported no HRSNs were categorized as *no risk*. Participants who indicated 0 or 1 ED visit in the past 12 months, and 1 or more HRSNs were considered *low risk*. The *high risk* group consisted of participants who visited the ED 2 or more times in the past 12 months, and reported 1 or more HRSNs.

Preliminary results indicated statistically significant differences in risk level by age, gender, race, ethnicity, income, and household size. Table 8 shows these characteristics by risk level, as well as the associated statistical test.

There were overall significant differences in age by risk level. The *no risk* group was youngest on average (*M* = 38.39, *SD* = 19.13), followed by the *low risk* group with a mean age of 43.15 (SD = 19.02), and the *high risk* group with a mean age of 49.90 (SD = 23.55). Each of the pairwise differences of age between these groups was also significant. Women were more likely to be classified as *no risk* and men were more likely to be classified as *high risk*. There were also significant differences in risk levels by race. Among the *high risk* category, American Indian or Alaska Native, Asian, and Black or African American

> **Risk Level: Significant Participant Characteristics**
> ➢ Age
> ➢ Gender
> ➢ Race
> ➢ Ethnicity
> ➢ Income
> ➢ Household Size

participants were more represented when compared to the overall sample. Additionally, American Indian or Alaska Native, Other race, including Native Hawaiian or other Pacific Islander, and White participants were more highly represented in the *low risk* than the overall sample. Finally, participants indicated as Other race, including Native Hawaiian or other Pacific Islander, were more highly represented among the *No Risk* category.

Additionally, when compared to Hispanic, Latino, or Spanish origin participants, non-Hispanic, Latino, or Spanish origin participants more highly represented among the *high risk* category and less represented among the *no risk* category. Participants with a household income of less than $10,000 were most highly represented among both the *high risk* and *low risk* categories. Generally, with increasing incomes participants were more likely to be in the *low risk* category. Household size and risk were also significantly associated; individuals living alone were more likely to be classified as *low risk* or *high risk* than *no risk*, and individuals living in households of two to four were more likely to be classified as *no risk* than *low risk* or *high risk*.

Table 9 Risk Levels by Participant Characteristics

	n (%) or M (SD)		
	High Risk	Low Risk	No Risk
Age, $F(2, 3601) = 109.38, p < .001$	49.90 (19.13)	43.15 (19.02)	38.39 (23.55)
Gender, $\chi^2(2) = 21.31, p < .001$			
Female	919 (40.7%)	464 (20.5%)	876 (38.8%)
Male	570 (47.5%)	257 (21.4%)	374 (31.1%)
Race, $\chi^2(8) = 39.20, p < 0.001$			
White	710 (41.0%)	409 (23.6%)	612 (35.4%)
Other race, including Native Hawaiian or other Pacific Islander	214 (36.3%)	139 (23.6%)	236 (40.1%)
Black or African American	260 (50.3%)	110 (21.3%)	147 (28.4%)
American Indian or Alaska Native	82 (45.3%)	57 (31.5%)	42 (23.2%)
Asian	32 (48.5%)	12 (18.2%)	22 (33.3%)
Ethnicity, $\chi^2(2) = 64.43, p < .001$			
Hispanic, Latino, or Spanish Origin	709 (37.1%)	413 (21.6%)	788 (41.3%)
Non-Hispanic, Latino, or Spanish Origin	839 (49.5%)	347 (20.5%)	508 (30.0%)
Income, $\chi^2(14) = 191.90, p < .001$			
Less than $10,000	447 (50.1%)	282 (31.6%)	164 (18.4%)
More than $10,000 but less than $15,000	103 (44.4%)	63 (27.2%)	66 (28.4%)
More than $15,000 but less than $20,000	141 (36.9%)	111 (29.1%)	130 (34.0%)
More than $20,000 but less than $55,000	85 (48.0%)	23 (13.0%)	69 (39.0%)
More than $25,000 but less than $35,000	155 (36.7%)	66 (15.6%)	201 (47.6%)
More than $35,000 but less than $50,000	73 (30.3%)	52 (21.6%)	116 (48.1%)
More than $50,000 but less than $75,000	28 (32.2%)	18 (20.7%)	41 (47.1%)
More than $75,000	22 (45.8%)	6 (12.5%)	20 (41.7%)
Household Size, $\chi^2(6) = 99.78, p < .001$			
Alone	371 (25.66%)	191 (27.48%)	140 (12.11%)
2 to 4	810 (56.02%)	364 (52.37%)	741 (64.1%)
5 to 8	237 (16.39%)	123 (17.7%)	260 (22.49%)
9 +	24 (1.66%)	16 (2.3%)	14 (1.21%)

Note. The Native Hawaiian or other Pacific Islander category was combined with the Other Race category due to the small sample size of Native Hawaiian/Pacific Islanders.

Emergency Room Utilization by Participants' Characteristics

Preliminary findings suggest there were significant differences in age by ED utilization, $F(2, 3802) = 115.1142$, $p < .001$. ED utilization was also significantly associated with: gender, $\chi^2(2) = 18.24$, $p < .001$; ethnicity, $\chi^2(2) = 37.81$, $p < .001$; income, $\chi^2(14) = 99.54$, $p < .001$; and household size, $\chi^2(6) = 34.99$, $p < .001$. ED utilization was not significantly associated with race, $\chi^2(2) = 2.35$, $p = .31$.

> **ER Utilization**
> **Significant Participant Characteristics**
> ➢ Age
> ➢ Gender
> ➢ Ethnicity
> ➢ Income
> ➢ Household Size

Health Related Social Needs by Participants' Characteristics

Further data analyses were completed to examine differences in several positive screenings for HRSNs including housing stability, food insecurity, transportation reliability, access to utilities (e.g., electric, gas, oil, water company), and safety by participants' characteristics. Differences in access to utilities and safety by participants' characteristics were not analyzed due to limited sample sizes.

Housing Stability

There was a statistically significant relationship between housing stability: gender, $\chi^2(1) = 30.92$, $p < .001$; race, $\chi^2(1) = 14.47$, $p < .001$; ethnicity, $\chi^2(1) = 28.55$, $p < .001$; income, $\chi^2(7) = 285.30$, $p < .001$; and household size, $\chi^2(3) = 218.27$, $p < .001$. There were no differences in age by positive screenings for housing instability, $t(3602) = 0.08$, $p = .94$.

Food Security

There was a significant relationship between food insecurity and all of the participant characteristics tested: age, $t(3602) = 3.01$, $p = .003$; gender, $\chi^2(1) = 9.04$, $p = .003$; race, $\chi^2(1) = 12.91$, $p < .001$; ethnicity, $\chi^2(1) = 12.59$, $p < .001$; income, $\chi^2(7) = 311.28$, $p < .001$; and household size, $\chi^2(3) = 85.85$, $p < .001$.

Transportation Reliability

There was a significant relationship between transportation reliability and all of the participant characteristics tested: age, $t(3602) = 3.38$, $p < .001$; gender, $\chi^2(1) = 15.40$, $p < .001$; race, $\chi^2(1) = 5.36$, $p = .02$; ethnicity, $\chi^2(1) = 19.23$, $p < .001$; income, $\chi^2(7) = 186.97$, $p < .001$; and household size, $\chi^2(3) = 106.83$, $p < .001$.

> **HRSNs Results**
>
> **Significant Participant Characteristics**
>
> **Housing Stability**
> ➢ Gender
> ➢ Race
> ➢ Ethnicity
> ➢ Income
> ➢ Household Size
>
> **Food Insecurity**
> ➢ Age
> ➢ Gender
> ➢ Race
> ➢ Ethnicity
> ➢ Income
> ➢ Household Size
>
> **Transportation Reliability**
> ➢ Age
> ➢ Gender
> ➢ Race
> ➢ Ethnicity
> ➢ Income
> ➢ Household Size

Summary of Differences in Risk, ED Visits, and HRSNs by Participant Characteristics

Differences in risk levels, ED utilization, and HRSNs by participants' characteristics were analyzed. Preliminary results showed differences across key characteristics: age, gender, race, ethnicity, income, and household size. Although many of these relationships were significant, additional analyses need to be conducted to interpret the clinical or practical significance of these associations and how they translate to reducing health disparities among underserved individuals.

Navigation Cases

During this period, 659 unique navigation cases were opened for individuals from the GTA, representing 1,242 specific navigation needs. This means each individual had on average around 2 needs cases created. Table 10 shows the number of navigation needs for each HRSN domain. The number of cases aligns very closely with the needs identified during the initial screenings, as food, housing, and transportation were the most common navigation need case created and were also the top three HRSN noted in the screening data.

Table 10 Navigation Need Domain

Case Type	Count
Food	434
Housing	314
Transportation	274
Utilities	174
Safety	45
Employment	1
Total Navigation Needs	**1,570**

Figure 10 illustrates the number of unique navigation cases created during each month. The number of cases created monthly has varied around the annual average of 54, with cases leveling around 20 to 25 per month since April 2020, around the time of Executive Order 2020-18.

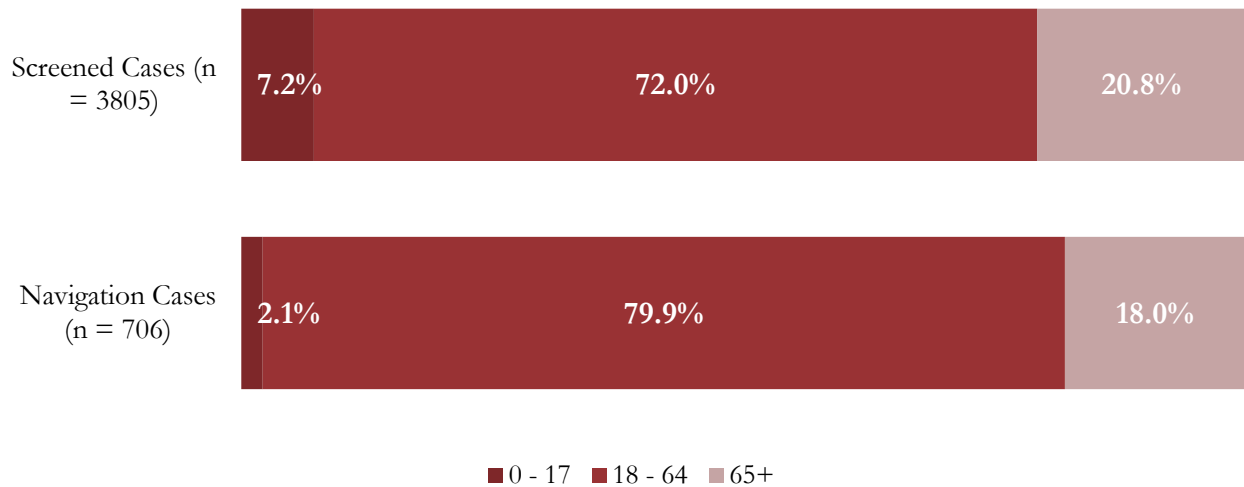**Figure 10 Unique Navigation Cases by Month**

Note. The horizontal dotted line represents average monthly cases. The vertical dashed line represents the implementation of Executive Order 2020-18.

Demographic Characteristics from Navigation Cases

Age

The age distributions for those receiving navigations differed slightly from those who were screened. A higher proportion of those individuals being navigated were between the ages of 18 and 64 years old, and fewer were under 18 years old or over 65 years old. Similarly, the mean age for navigation cases ($M = 49.64$; $SD = 16.73$) was higher than for all screened cases ($M = 44.84$; $SD = 21.43$).

Figure 11 Age Distribution of Navigation Cases Compared to Screened Cases

Gender

Navigation cases differed slightly in terms of gender from screenings, as fewer females (64% vs. 57.1%) and more males (36% vs. 38.9%) had navigation cases opened than were screened.

Race and Ethnicity

Tables 11 and 12 illustrate the totals for each selection for navigation cases and screenings. Participants were able to select more than one applicable race or ethnicity.

Race

The group of individuals screened and those with navigation cases differed by race. Although White participants comprised the majority for both screened and navigated cases, there was a higher proportion of African American and American Indian/Alaska Native individuals and a lower proportion of individuals of other races involved in 2MATCH navigation compared to screenings.

Table 11 Race of Individuals with Navigation Cases

Race	Screened (n = 3.226)	Navigated (n = 636)
White	58.1%	53.9%
Other race	17.9%	14.3%
Black or African American	16.0%	21.1%
American Indian or Alaska Native	5.6%	8.2%
Asian	2.0%	2.4%
Native Hawaiian or other Pacific Islander	0.3 %	< 0.1 %

Ethnicity: Hispanic, Latino, or Spanish Origin
Differences in ethnicity between individuals who were navigated and the population screened were observed primarily with regard to non-Hispanic, Latino or Spanish origin participants and Mexican, Mexican American, and Chicano origin participants. Non-Hispanic, Latino or Spanish participants represented a higher proportion of navigation cases than screened cases (59.3% vs 49.3%), and Mexican, Mexican American, and Chicano represented a lower proportion of navigation cases than screened cases (36.3% vs. 26.8%). These differences might be driven by the higher proportion of individuals identifying as African American and American Indian/Alaska Native in navigation cases.

Table 12 Ethnicity (Hispanic, Latino, or Spanish Origin) of Individuals with Navigation Cases

Ethnicity	Screened (n = 3,437)	Navigated (n = 666)
Yes, Mexican, Mexican American, Chicano	36.3%	26.8%
Yes, Another Hispanic, Latino, or Spanish origin	13.4%	12.3%
Yes, Puerto Rican	0.6%	< 0.1%
Yes, Cuban	0.4%	< 0.1%
No, not of Hispanic, Latino, or Spanish Origin	49.3%	59.3%

Income

A difference in the income distribution was observed between participants who were screened versus those with navigation cases. Generally, participants who participated in navigation had lower household incomes (59.9% reported incomes less than $10,000). Further, few (5.4%) participants with navigation cases incomes greater than $35,000, compared to 15.1% of screened cases.
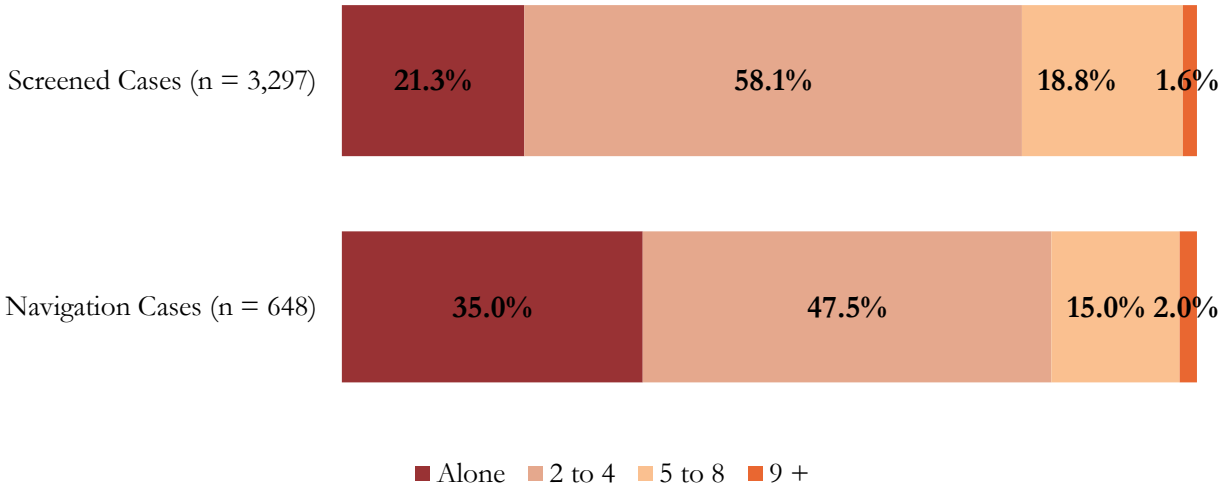
Figure 12 Incomes of Navigation Cases versus Screened Cases

- Less than $10,000: Navigation Cases 59.9%, Screened Cases 36.0%
- More than $10,000 but less than $15,000: Navigation Cases 10.0%, Screened Cases 9.3%
- More than $15,000 but less than $20,000: Navigation Cases 10.9%, Screened Cases 15.4%
- More than $20,000 but less than $55,000: Navigation Cases 6.5%, Screened Cases 7.1%
- More than $25,000 but less than $35,000: Navigation Cases 7.2%, Screened Cases 17.0%
- More than $35,000 but less than $50,000: Navigation Cases 4.1%, Screened Cases 9.7%
- More than $50,000 but less than $75,000: Navigation Cases 0.9%, Screened Cases 3.5%
- More than $75,000: Navigation Cases 0.4%, Screened Cases 1.9%

■ Navigation Cases (n = 539)   ■ Screened Cases (2,482)

Household Size

Individuals who lived alone were more highly represented among navigation cases than screened cases.

Figure 13 Household Size of Navigation Cases versus Screened Cases

	Alone	2 to 4	5 to 8	9 +
Screened Cases (n = 3,297)	21.3%	58.1%	18.8%	1.6%
Navigation Cases (n = 648)	35.0%	47.5%	15.0%	2.0%

Navigation Status

Navigation needs cases are divided into three status categories: *Resolved*, *Unresolved* and *In Progress*. Further, within each of these status categories are various resolution types. These resolution status types and definitions are provided in Appendix 3. The majority (91%) of the 1,241 navigation needs cases tracked were *In Progress* at the time of data transfers. Processes are being implemented to increase the amount of resolved cases and decrease the amount of cases that are *In Progress*.

Table 13 Status of Opened Navigation Cases

HRSN Status	HRSN Status Option	Count	Percentage
In Progress	1. Resolution Pending	1,142	91.9%
Resolved	1. Resolved	35	2.8%
	2. Successful	5	0.4%
Unresolved	1. Unavailable	2	0.2%
	2. Attempt Failed	13	1.0%
	3. Opt Out	45	3.6%
Total		**1,241**	

Navigation Success Stories

Over the past year, Dignity Health has collected several success stories that highlight the impact of the 2MATCH program. Below are a few of those success stories, several of which also illustrate the difficulty accessing resources and the immediacy of needs during the COVID-19 pandemic.

Single Mother with Three Children

The patient was receiving care in the Inpatient Tower. She was identified as a high risk after she was contacted and screened telephonically by the 2MATCH Advocate assigned to this CDS. A care plan was created for her the same day. The patient was in need of assistance in paying her rent and utilities as her work hours had been reduced due to COVID-19. The 2MATCH Advocate contacted Chicanos Por La Causa, Inc. which provided assistance to the patient. The 2MATCH Advocate followed up with the patient two weeks later and learned that the patient and her family were able to remain in their apartment and their utilities were paid due to the assistance she received from 2MATCH and Chicanos Por La Causa, Inc. The patient was very appreciative for the help provided to her during these difficult times.

Female Patient Presenting in the ED who had Previously been Screened

While performing his regular program duties in the hospital ED, the 2MATCH Advocate encountered a patient that had previously completed the AHC survey and was deemed high risk. The Advocate had lost contact with the patient because was she was homeless and unable to charge her cell phone. The patient did not have the ability to charge her phone for several weeks and, as a result, had not been able to return the Advocate's phone calls. The Advocate noticed that the patient's health had deteriorated from the last time he had encountered her in the ED. Her feet were very swollen and she was not able to walk without assistance. The patient asked the Advocate to help her find an apartment and said that she had a therapy dog. This was a difficult task as the majority of housing programs require double or triple the first month's rent, and it is even more difficult when there is a pet involved. Despite the fact that the Advocate and the Case Manager were able to locate a rehab facility for the patient, the patient refused to go because pets were not allowed at that specific facility. The patient begged the Advocate for help and stated, "Don't give up on me *mijito*" (*mijio* means son in Spanish and is a common term in Hispanic cultures). Knowing that the patient was very ill and did not have family to assist her, the Advocate immediately took action and reached out to the other 2MATCH Advocates for assistance. He also obtained a few bus passes for the patient. With the help of the other Advocates, the patient was provided with a satchel that contained hygiene items, warm clothing and an over the counter ointment to assist the patient with her joint pain. The patient was also provided with a voucher to obtain a meal in the hospital cafeteria. The Advocate continues to communicate with the patient and to search for housing for the patient and her therapy dog. It is important to note that there is a shortage of low-income housing in Arizona.

Female Patient Needing Food Assistance and On-the-spot Resources

The patient was screened and was very open to receiving assistance when she was contacted and the action plan was being created. The patient answered all the questions asked and was very polite. She was asked her about her needs and she stated that she has her own apartment and pays about $250 a month including utilities included housing was not an issue. She then said that she did not know where to call to make an appointment to apply for food stamps. She was provided information to contact Keogh Health Connection. The patient asked who they were and if they would truly help

her. The patient was assured that Keogh was very helpful and would answer any questions about food stamps that she had. The patient was then asked if the 2MATCH Advocate could provide additional resources via text to obtain food. The patient stated it would be easier for her to obtain resources over the phone. She was provided information to contact Keogh Health Connection and was also provided information to ICM Food and clothing bank. The 2MATCH Advocate repeated the information so that she was sure that the patient had time to write it down. This situation stood out for the 2MATCH Advocate as she had to provide information about resources to the patient immediately. This particular situation demonstrated to the 2MATCH Advocate that it is important to be prepared especially during these difficult times (COVID-19) when patients need all the assistance 2MATCH can provide.

Male Patient Recently Diagnosed with Cancer

The patient that was being navigated was recently diagnosed with cancer and was not able to obtain food stamps due to COVID-19. The 2MATCH Advocate referred the patient to Keogh Health Connection for assistance in applying for food stamps. Later that week, the patient contacted the 2MATCH Advocate to let him know that the process worked well and he appreciated being referred to Keogh Health Connection for assistance.

Single Mother with Two Children Who Spent Three Months Living in Car during Summer

The Advocate spent hours calling community organizations to seek help for this family. An apartment was identified but the single mother was unable to pay for the utility startup fee and only had a short window to identify funds or she would lose the apartment. The Advocate communicated this need with the Activate worker from Internal Medicine who was then able to locate funds for the utilities via Foundation for Senior Living. The family was no longer homeless and was very grateful for the assistance the 2MATCH Program and Foundation for Senior Living had provided.

Appendices

Appendix 1: Screenings by Zip Code for non-GTA

Zip Code	# Screenings	Zip Code	# Screenings	Zip Code	# Screenings
85201	13	85132	3	85135	1
85012	12	85204	3	85138	1
85013	12	85208	3	85139	1
85014	12	85281	3	85140	1
85016	11	85305	3	85147	1
85303	10	85383	3	85203	1
85044	9	85392	3	85205	1
85301	9	83021	2	85207	1
85041	8	85023	2	85209	1
85202	8	85043	2	85232	1
85018	7	85045	2	85233	1
85051	7	85050	2	85248	1
85282	7	85128	2	85252	1
85283	7	85142	2	85258	1
85257	6	85213	2	85286	1
85021	5	85216	2	85302	1
85042	5	85224	2	85304	1
85256	5	85225	2	85318	1
85308	5	85234	2	85351	1
85339	5	85254	2	85373	1
85027	4	85268	2	85379	1
85028	4	85295	2	85381	1
85029	4	85297	2	85710	1
85032	4	85306	2	85714	1
85037	4	85315	2	85943	1
85210	4	86045	2	86009	1
85307	4	82520	1	86015	1
85323	4	85002	1	86025	1
85326	4	85022	1	86040	1
85382	4	85025	1	86043	1
85005	3	85053	1	86044	1
85034	3	85060	1	86510	1
85048	3	85081	1	86511	1
85083	3	85091	1	87037	1

Note. There were a total of 374 screenings for individuals who lived outside the GTA. However, 58 participants did not provide a valid zip code.

Appendix 2: AHC HRSN Screening Tool Core Questions

AHC HRSN Screening Tool Core Questions

If someone chooses the underlined answers, they might have an unmet health-related social need.

Living Situation

1. **What is your living situation today?**[3]
   - ☐ I have a steady place to live
   - ☐ I have a place to live today, but **I am worried** about losing it in the future
   - ☐ I do not have a steady place to live (I am temporarily staying with others, in a hotel, in a shelter, living outside on the street, on a beach, in a car, abandoned building, bus or train station, or in a park)

2. **Think about the place you live. Do you have problems with any of the following?**[4]
   CHOOSE ALL THAT APPLY
   - ☐ Pests such as bugs, ants, or mice
   - ☐ Mold
   - ☐ Lead paint or pipes
   - ☐ Lack of heat
   - ☐ Oven or stove not working
   - ☐ Smoke detectors missing or not working
   - ☐ Water leaks
   - ☐ None of the above

Food

Some people have made the following statements about their food situation. Please answer whether the statements were OFTEN, SOMETIMES, or NEVER true for you and your household in the last 12 months. [5]

3. **Within the past 12 months, you worried that your food would run out before you got money to buy more.**
   - ☐ Often true
   - ☐ Sometimes true
   - ☐ Never true

4. **Within the past 12 months, the food you bought just didn't last and you didn't have money to get more.**
   - ☐ Often true
   - ☐ Sometimes true
   - ☐ Never true

Transportation

5. **In the past 12 months, has lack of reliable transportation kept you from medical appointments, meetings, work or from getting things needed for daily living?[6]**
   - ☐ Yes
   - ☐ No

Utilities

6. **In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home?[7]**
   - ☐ Yes
   - ☐ No
   - ☐ Already shut off

Safety

Because violence and abuse happens to a lot of people and affects their health we are asking the following questions. [8]

7. **How often does anyone, including family and friends, physically hurt you?**
   - ☐ Never (1)
   - ☐ Rarely (2)
   - ☐ Sometimes (3)
   - ☐ Fairly often (4)
   - ☐ Frequently (5)

8. **How often does anyone, including family and friends, insult or talk down to you?**
    ☐ Never (1)
    ☐ Rarely (2)
    ☐ Sometimes (3)
    ☐ Fairly often (4)
    ☐ Frequently (5)

9. **How often does anyone, including family and friends, threaten you with harm?**
    ☐ Never (1)
    ☐ Rarely (2)
    ☐ Sometimes (3)
    ☐ Fairly often (4)
    ☐ Frequently (5)

10. **How often does anyone, including family and friends, scream or curse at you?**
    ☐ Never (1)
    ☐ Rarely (2)
    ☐ Sometimes (3)
    ☐ Fairly often (4)
    ☐ Frequently (5)

A score of 11 or more when the numerical values for answers to questions 7-10 are added shows that the person might not be safe.

Appendix 3: HRSN Resolution Status

HRSN Status	HRSN Status Option	HRSN Status Definition
Resolved	1. Resolved	The beneficiary's need has been met.
	2. Successful	The beneficiary made contact with a community service provider that may be able to address the unmet need within the next six months.
Unresolved	1. Unavailable	A community service is unavailable to address the unmet need for more than six months (for example, the beneficiary made contact with a community service provider that may be able to address the unmet need but was put on a wait list longer than six months and there is no other community service available with a shorter wait list).
	2. Attempt Failed	The navigator attempted to contact the beneficiary on at least three consecutive occasions to resolve the unmet need, but was unable to reach the beneficiary.
	3. Opt Out	The beneficiary opted out of navigation services for the unmet need.

Appendix 5: Federal, State, and Local Government Response to COVID-19: A Focus on Social Determinants of Health

On March 11, 2020, Arizona Governor Doug Ducey issued a declaration of a Public Health State of Emergency in response to COVID-19, setting in motion measures to address the spread of the disease in Arizona. This declaration was soon followed by a series of Executive Orders defining and limiting the closure of essential services (EO 2020-17 Continuity of Work, March 26) the implementation and lifting of a stay-at-home policy (EO 202-18 Stay Home, Stay Health, Stay Connected, March 30) and a host of other directives. The following summarizes additional actions, focusing on their impact on residents of Maricopa County and the Phoenix metropolitan area.

Maricopa County implemented a face mask regulation on June 20, 2020 enforced through a $50 fine.[2] The Arizona Department of Transportation (ADOT) has also taken steps to reduce exposure by delaying driver license expiration dates[3] and continuing appointments for necessary services.[4]

The State of Arizona allocated additional funding for homeless shelters[5] and rental assistance programs while placing an eviction moratorium until October 31, 2020.[6] Rental assistance for up to three rental payments was available to low-income residents of Maricopa County through the county Human Services Department and Community Action Program (CAP).[7] Through a cooperative agreement between the largest electric utility providers, there will be no electricity shut-offs in Arizona due to inability to pay as well as no late fees or interest, and companies will offer flexible payment options.[8] Arizona Public Services (APS) has implemented similar measures for Maricopa County customers including an emergency fund.[9] A portion of the federal funds from the Low Income Home Energy Assistance Program (LIHEAP) have been allocated to tribal households.[10]

To address food security, state public assistance programs including Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF) have been expanded and processes streamlined to increase efficiency, reduce eligibility barriers, and increase food access.[11] The Maricopa County Women, Infants, and Children (WIC) program has expanded covered food options and offers phone and video appointments.[12] Many school districts across Arizona and specifically in Maricopa County are also offering free breakfast and lunch pickup for children 18 years old or younger during school closures and virtual instruction.[13] To reduce the burden of healthcare costs, Arizona health insurance plans have been required to provide enhanced benefits to offset COVID-19 related medical costs.[14]

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[2] https://www.maricopa.gov/CivicAlerts.aspx?AID=1455
[3] https://azgovernor.gov/file/34238/download?token=G6chs-ZS
[4] https://azdot.gov/adot-news/mvd-update-office-appointments-required-change-license-expirations
[5] https://azgovernor.gov/governor/news/2020/07/governor-ducey-announces-975000-az-coronavirus-relief-fund-support-homeless
[6] https://www.azcommerce.com/covid-19/housing/
[7] https://www.maricopa.gov/5583/COVID-Crisis-Rental-Assistance
[8] https://azgovernor.gov/governor/news/2020/03/governor-ducey-announces-electric-utility-relief-package
[9] https://www.aps.com/en/Residential/Save-Money-and-Energy/Disconnections
[10] https://azcc.gov/news/2020/05/14/resources-available-$16-million-in-low-income-home-energy-assistance-is-now-available-to-az-customers-during-covid-19-hot-summer-months-$1-million-for-tribes
[11] https://azgovernor.gov/governor/news/2020/03/governor-ducey-requests-changes-food-assistance-program
[12] https://www.maricopa.gov/1491/Women-Infants-Children-WIC
[13] https://www.azhealthzone.org/summerfood
[14] https://www.azmed.org/page/COVID19Telemedicine