
Pathways Innovative Intervention

Assessment Report

for the

Hospital Council of Northwest Ohio

Edward Chiyaka

Joshua Filla

Pamela Ferguson

John Hoornbeek

Research and Evaluation Bureau

in collaboration with

The Center for Public Policy and Health

Kent State University

Final Report

12/14/17

Table of Contents

| | |
|--|-----------|
| Introduction | 3 |
| Overview of Methods and Observations on Data | 5 |
| Findings | 7 |
| Evaluation Question 1 | 7 |
| Comparison to Previous Evaluation Findings | 8 |
| Implications for Program Management | 8 |
| Evaluation Question 2 | 9 |
| Comparison to Previous Evaluation Findings | 12 |
| Implications for Program Management | 12 |
| Evaluation Question 3 | 14 |
| Comparison to Previous Evaluation Findings | 19 |
| Implications for Program Management | 19 |
| Evaluation Question 4 | 21 |
| Comparison to Previous Evaluation Findings | 23 |
| Implications for Program Management | 23 |
| Evaluation Question 5 | 24 |
| Comparison to Previous Evaluation Findings | 25 |
| Implications for Program Management | 25 |
| Evaluation Question 6 | 26 |
| Comparison to Previous Evaluation Findings | 30 |
| Implications for Program Management | 31 |
| Evaluation Question 7 | 32 |
| Comparison to Previous Evaluation Findings | 43 |
| Implications for Program Management | 44 |
| Evaluation Question 8 | 45 |
| Comparison to Previous Evaluation Findings | 47 |
| Implications for Program Management | 47 |
| Conclusion | 48 |
| Appendix 1: Sources of Referrals into the Pathways HUB | 52 |
| Appendix 2: Providers Accepting Referrals from CHWs (Medical Home Pathway) | 53 |
| Appendix 3: Other services provided within the Social Services Referral Pathway | 54 |

Introduction

The Northwest Ohio Pathways HUB (Pathways Program) of the Hospital Council of Northwest Ohio seeks to improve healthcare access and health outcomes for low-income adults with chronic disease(s). It seeks to do so by increasing the number of healthcare clinics and community agencies that utilize Community Health Workers (CHWs) engaged in implementing the Pathways model, and by ensuring that program clients can meet their health needs by completing “Pathways” tailored and assigned to address their situations.

The Pathways model involves creating a HUB, which requires the hiring and training of staff to maintain the HUB’s operations. The model also includes a certification process that identifies key standards that all HUBs must meet to be recognized as a Certified Community HUB. The HUB then contracts with community agencies which hire CHWs to provide care coordination services to high risk Medicaid populations. They also contract with Care Coordination Systems (CCS) for consulting services, and administering an internet-based care management database system. The HUB also contracts with funders to pay for outcomes, including Medicaid Managed Care Plans, to provide care coordination linkages to their high-risk Medicaid population.

This evaluation report provides evidence regarding the extent to which the Pathways initiative for adults in Lucas County, Ohio has improved client access to healthcare and community resources over the period of its existence from July 2015 to June 2017. The evaluation plan for the Adult Pathways Program calls for efforts to address a total of eight evaluation questions. This document summarizes responses for these questions, based on data available through the Pathways HUB and other means, as of June, 2017. The eight questions are the following:

1. How many healthcare systems in Lucas County use Community Health Workers (CHWs) in conjunction with the Adult Pathways Program?
2. How many healthcare providers use CHWs to serve their clients?
3. How many adults have used CHW-Pathways services since the beginning of the project period?
4. How does client readiness to improve health change over time for clients participating in the Adult Pathways Program?
5. Does a high level of client readiness to improve health increase the likelihood that a client

will successfully complete health improvement Pathways recommended by the CHWs assisting them?

6. For at least one identified Pathway, to what extent are clients successful in navigating the identified follow up Pathway actions to completion as a means of improving their health status?
7. What factors appear to contribute to Adult Pathway clients' successful completion of the identified Pathway(s)?
8. Why do clients fail to complete the identified Pathways?

Drawing information from the CCS database in June 2017, this report is the third and final evaluation of the Pathways Program in Lucas County, Ohio. During its two years of existence, the Pathways Program has contracted with organizations to hire CHWs and has trained these CHWs, and worked with them to develop procedures for identifying and working with clients. The program has also developed processes for entering data and information about Pathways clients into its electronic database and trained its staff to carry out these functions.

Given these new and dynamic situations, the evaluation team faced a number of challenges. These challenges included: 1) understanding the organization of the database, the means by which to manipulate data provided by it, and the exact meanings of the database elements being investigated, and; 2) understanding program practices for the Lucas County Adult Pathways Program. However, even though these challenges continue to exist, they have been successfully addressed to a substantial degree. As a result, we have now been able to compile data and analyses which we believe accurately reflect the Toledo-Lucas County HUB-Pathways Program's growth and evolution, while also providing useful insights to help guide program improvement efforts.

This report thus documents the evolution of the Northwest Ohio Pathways HUB chronic disease program through the first two years of its existence, and provides analyses and insights for program managers and others seeking to address health disparities among low income individuals with chronic illnesses. In so doing, it builds upon the first two reports issued by the Kent State University evaluation team, which covered the first six months and 18 months of the program, respectively. The report also shares comparative information associated with changes in key evaluation measures between the three time periods covered in these reports and offers insights regarding potential follow up items for program managers seeking program improvement.

Overview of Methods and Observations on Data

The Northwest Ohio Pathways HUB contracts with agencies that employ CHWs whose goals include assisting clients in removing barriers to care to improve access to health care services. The HUB is a coordinating entity which trains CHWs, and monitors, tracks and manages CHW activities with their clients. It helps participating entities meet their separate but overlapping responsibilities for assisting low income adults in the community. The HUB utilizes a “fee for performance” payment model where care coordinating agencies are paid based on specific, measurable outcomes they achieve with their clients. The Pathways HUB administers a database system which includes a full range of data elements focusing on socio-demographic information, Pathways identified to meet client needs, client-community health worker interactions, client follow up information and many more elements.

During the course of this project, the KSU evaluation team downloaded data from the Pathways HUB-CCS database, a system that includes substantial data that are useful for tracking client progress in the program. The last and final major download for this project was done on June 30, 2017. Using the downloaded data, important data elements which help answer the evaluation questions above were identified, and the resulting information was utilized for this evaluation report. In cases where further analysis for specific Pathways was needed to respond to the evaluation questions posed, we focused on the Medical Home Pathway and/or the Social Services Referral Pathways as indicated in the evaluation plan developed for this project.

The data used to answer the evaluation questions come in multiple downloads or come from multiple data sets, sometimes with different data structures. Because of the nature of the data, certain data downloads are used to inform some evaluation questions and in some instances, the data downloads are merged in order to answer different evaluation questions.

Because of the nature of the data included in the CCS database and the manner in which the evaluation team gains access to it, significant efforts are required to clean and organize the data to enable its analysis. The third and final data download, for example, required multiple meetings, phone calls, and trial data downloads between Kent State and Pathways HUB staff to identify and rectify a number of inconsistencies in the dataset and to achieve a clean dataset. Through the process of downloading, organizing and analyzing the data for all three evaluation reports, we noted a few potential areas of concern for program managers to consider addressing in the future. Over

the duration of the program, we noted a few irregularities with data entry and management and some of the identified issues were addressed in the short term. First, the input of fictional data for training purposes has potential to affect evaluation findings since they have been mixed with the actual program data. Second, we identified duplicate entries for Pathways assigned to some individuals. Program staff shared that originally the CCS system was set to automatically open Pathways based on answers to the questions on the adult checklists that are used to collect demographic, background and health information. However, the Pathways did not open immediately, so often times CHWs would open a Pathway and then a duplicate was opened by the system. This resulted in duplicate pathways until the auto-trigger was deactivated. And finally, we noted that there was at least one inconsistency in similarly named data elements, such as the Pathways Completed elements, reported in different data reports. Because there is no available master code book for the data sets, we cannot tell if these inconsistencies are due to data input errors or whether the data elements are actually reporting on two slightly different issues. Despite experiencing these kinds of difficulties, we were able to work closely with Northwest Ohio Pathways HUB staff to systematically address these issues in relation to the dataset used to under-lie this report.

The CCS database is a substantial asset for the Pathways Program, and for the clients who benefit from this program. We were able to make use of the data made available to us in order to address the evaluation questions underlying our assessment. Our hope and intention in making the observations above is to enable improvements in the use of this database for evaluation and research processes in the future, as well as in pursuing the tracking objectives for which it appears to have been designed.

Findings

Evaluation Question 1

How many healthcare systems in Lucas County use Community Health Workers (CHWs) in conjunction with the Adult Pathways Program?

A health system is defined as a combination of resources, organization, financing, and management that culminates in the delivery of health services to the population¹. In the context of this evaluation, population is defined as the population of Lucas County. A search for health systems operating in Lucas County has shown that there appear to be seven (7) health systems in the county of which six of them align with the Pathways HUB's primary adult and low-income population. These health systems² are as follows:

- 1) The Toledo Clinic
- 2) The University of Toledo Medical Center
- 3) Neighborhood Health Association
- 4) Mercy Health
- 5) Toledo-Lucas County Health Department
- 6) ProMedica Health System
- 7) US Veteran's Affairs Health Care System³

Of the identified health systems that are aligned with the HUB's primary focus in Lucas County, Ohio, five (83%) employ Community Health Workers (CHWs) in conjunction with the Pathways model. These health systems include The University of Toledo Medical Center, Neighborhood Health Association, Mercy Health, Toledo-Lucas County Health Department, and ProMedica Health System. These data suggest that a relatively large number of health systems in Lucas County are taking advantage of the Pathways HUB. As yet, the Toledo Clinic does not appear to have hired a CHW associated with the Pathways HUB.

¹Roemer (1991). National Health Systems of the World, Vol. 1: The Countries. New York: Oxford University Press.

²Based on Roemer's definition of "health system", the evaluation team has excluded organizations that only operate urgent care facilities, as they do not appear to have a "combination of resources and organization". The evaluation team also excluded organizations operating only long-term care facilities as they do not meet the definition of delivering health services to the (entire) population of Lucas County.

³The US Veteran's Affairs Health Care System mainly services Veterans and the Medicare population and therefore does not align with the Pathways HUB's primary population of Medicaid eligible populations.

Comparison to Previous Evaluation Findings

- There was no change in the number of health systems using CHWs with the Pathways model in Lucas County between December 2016 (18 months after program inception) and June 2017 (24 months after program inception). As of June 2017, there were five healthcare systems in Lucas County using CHWs, an increase from the four healthcare systems using CHWs after six months of program operations in December 2015, as identified in the first KSU evaluation report⁴ covering that time period. The health system added during that time was the ProMedica Health System.

Implications for Program Management

- The high proportion of health systems in Lucas County which are now part of the Pathways Program suggests strong progress in engaging Lucas County health systems.
- Pathways Program managers may want to consider reaching out to any remaining and appropriate health systems in Lucas County, Ohio. Based on our inventory of health systems, one such system not currently participating in the Pathways Program is the Toledo Clinic, although it is possible that there are others which were not uncovered during our identification of Lucas County health systems earlier in this project.
- Program managers may also want to consider meeting with currently participating health systems to see how CHWs are assisting them, ascertain the extent to which they are satisfied with their participation in the Pathways HUB Program, and determine if there are ways in which the program may better meet their needs.

⁴ Chiyaka, E., Freeman, P., Hoornbeek, J., Filla, J. & Deepa, S. (2016). Pathways innovative intervention assessment report for the Hospital Council of Northwest Ohio.

Evaluation Question 2

How many healthcare providers use CHWs to serve their clients?

In this section, we document organizations providing health related services to clients of the Pathways Program, as well as health providers who have hired CHWs to assist them with their work. We also discuss the distribution of organizations sending clients to the Pathways HUB Program and the distribution of providers which/who receive referrals of clients from CHWs (and other sources). Healthcare providers are organizations or individuals which/who provide direct health care services to clients (and may work for, or in cooperation with, health systems). Based on entries in the HUB database as of June 2017, the following eight health care providers appear to have hired CHWs:

1. Dental Center of Northwest Ohio
2. Mercy Family Practice
3. Mercy Health (Chronic Disease Management)
4. Mercy St. Vincent Family Care Center
5. Neighborhood Health Association
6. Ohio Living
7. ProMedica Physician Group
8. University of Toledo Medical Center

In addition, CHWs have been hired by four other organizations which are not health care providers.

These organizations include:

9. Adelante
10. Toledo/Lucas County CareNet⁵
11. University Church
12. Pathway⁶

⁵ A non-profit community agency partnering with ProMedica, Mercy, and all healthcare providers to connect underserved populations to health care.

⁶ A community organization that provides social services which has no organizational connection with the Pathways HUB.

A total of 21 CHWs have been hired by these 12 participating organizations since the program launch in July 2015 (although a subset of those hired no longer work with the Pathways HUB). The CHWs, in turn, have assisted clients in gaining access to various categories of service(s), also referred to as “Pathways”, offered through the Pathways Program⁷.

Referrals In

Clients are referred into (e.g. “referrals in”) the Pathways Program by individuals, institutions and other sources. Table 1 shows that the largest percentage of referrals into the program resulted from Hospitals, CHWs, and Health Providers. Other major sources of referrals into the program include self-referrals, other Public Agencies, and “Other” sources. While the “Other” category is a reasonably large one, at the time the data were downloaded and made available to the evaluation team it was not possible to report more detailed information on these “Other” sources of referrals into the program.

Table 1: Summary of referrals into the program

| Source of referral | Number of referrals in | Percent (%) |
|--------------------------|------------------------|-------------|
| Hospital | 175 | 24.3 |
| Community Health Workers | 116 | 16.1 |
| Health Provider | 110 | 15.3 |
| Other*(Not Specified) | 95 | 13.2 |
| Self | 90 | 12.5 |
| Other Public Agency | 85 | 11.8 |
| CareNet | 25 | 3.5 |
| Health Department | 13 | 1.8 |
| Insurance Companies | 6 | 0.8 |
| School | 3 | 0.4 |
| 211 Telephone Referral | 1 | 0.1 |
| Total | 719 | 100 |

*The category “Other” is the fourth most frequent source of referrals in. However, the database does not specify what kinds of organizations and/or individuals are included in this category.

Note: This table shows an aggregated list of sources of referrals. For a detailed list of sources of referral, see Appendix 1.

⁷ Health Insurance, Medical Home, Medical Referral, Education, Medication Assessment, Housing, Smoking Cessation, Adult Education, Medication Management, Behavioral, Employment, and Social Service Referral (multiple services) are examples of Pathways used in the Pathways HUB Program.

Referrals Out

After clients meet a Pathways Program CHW, they are referred to healthcare and other service providers who assist them to better address their health needs (these are called “referrals out”). To gain a sense of the kinds of service providers to whom Pathways Program clients are being referred, we used downloaded data from the CCS database to inventory the kinds of service providers who are receiving referrals for services relating to finding an ongoing “Medical Home” (these are clients involved in the “Medical Home Pathway”).

As of June 2017, there have been a total of 92 referrals to medical providers from CHWs under the Medical Home Pathway during the first 24 months of the program, an increase of more than 100% from the 45 referrals reported in the second report covering the first 18 months of the program (through December 2016). The largest percentage of practices taking referrals from CHWs are Mercy Affiliated Practices (35.9%), but the other commonly used service providers include Neighborhood Health Association (19.6%), and the ProMedica Affiliated practices (12.0%). Table 2 shows a summary of different health providers taking referrals from CHWs for clients in need of medical homes.

Table 2: Practices taking referrals from Community Health Workers for the Medical Home Pathway

| Source of Referral | Number of referrals out | Percent (%) |
|---------------------------------------|-------------------------|-------------|
| Mercy Affiliated Practices | 33 | 35.9 |
| Neighborhood Health Association | 18 | 19.6 |
| ProMedica Affiliated | 11 | 12.0 |
| Health Department | 9 | 9.8 |
| Toledo Clinic | 9 | 9.8 |
| Independent Health Services | 6 | 6.5 |
| University of Toledo Health Practices | 6 | 6.5 |
| Total | 92 | 100 |

Notes:

*This table shows an aggregated list of practices taking referrals. For a detailed list of practices taking referrals from Community Health Workers, see Appendix 2.

**An additional 95 clients had been assigned to the Medical Home Pathway but did not have the medical provider name listed in the database to be included in Table 2.

Comparison to Previous Evaluation Findings

- As of June 30, 2017, there were eight health providers and four other organizations that had hired and were using CHWs to serve their clients. These numbers remain unchanged since our last report covering program activities in the first 18 months of the program (through December 2016). However, this number does represent an increase from a total of only four such organizations documented in the first evaluation report.
- As of June 2017, a total of 21 CHWs have served clients in the Lucas County Pathways HUB program. This figure includes all CHWs hired since the inception of the program, including those who are no longer employed as CHWs. At the end of the first six months of the program's operation, only seven CHWs were in place and providing services to clients.
- A relatively high proportion of referrals into the program are coming from CHWs and Hospitals, and a plurality of referrals out in the Medical Home Pathway are to Mercy Affiliated Practices. The total numbers of referrals into the program and from the Medical Home Pathway have increased by 67% (431 to 719) and more than 100% (45 to 92 fully documented referrals), respectively.

Implications for Program Management

- The increase in the number of CHWs hired, along with significant increases in participating care coordination agencies, suggests that the program has grown substantially since its inception in July of 2015. During the first six months of 2017, the substantial growth in the program reflects both more people served and more people and organizations serving them. Given this growth, it may be a good time for program managers to assess the extent to which CHWs are working together effectively with physicians and their staffs to ensure smooth program operations and to enable quality care for Pathways Program participants.
- More than a third (35.9%) of individual referrals made in the medical home pathway go to Mercy affiliated practices. Program managers may want to assess whether this relatively high level of reliance on Mercy affiliated practices is appropriate and sustainable, and whether other health providers or systems may be able to provide additional aid to clients in this portion of the Pathways Program.

- In the database, the “Other” category makes up almost 12% of all referrals into the program. Program management may want to work toward making these entries in the “Other” categories more explicit so as to be able to identify more comprehensively who is referring the clients to the program.
- In addition, while the CCS database provides information on 92 practices receiving referrals through the Medical Home Pathway, no specific information on the practices to which these clients are referred appears to be available for 95 clients with Medical Home Pathways referrals in the database. Program managers should consider ways to ensure more complete and specific data entry for these client referrals.

Evaluation Question 3

How many adults have used CHW-Pathways services since the beginning of the project period?

In order to address this question, it is helpful to understand the steps through which clients are processed through the Pathways Program. We start by articulating the client enrollment process into the Pathways Program and by describing the reasons why clients are discharged from the program. We then present information on clients who have entered into the program and share information on their use of individual Pathways and their associated levels of completion. Additionally, for the Social Services Referral Pathway, we show the frequency of use for different services.

The process of entering into the Pathways Program is divided into three (3) distinct steps. The first step is **referral** where prospective clients are identified through canvassing, managed care organizations, and other external agencies (see Table 1 above for more detailed information on ways clients are referred to the Pathways Program). Once a client is referred to the program, their basic information is entered into the CCS database to check for client duplication in the client profile. If the client is not already in the system, the next stage (step 2) of checking for client eligibility⁸ is initiated. At this stage, **eligibility screening** allows the CHW to determine if the client is eligible to receive program services. If the client is not eligible, the HUB manager is notified, and s/he deactivates the client. According to program documents⁹, if the client is found to be eligible, a **Pathways consent form** and the **CHW's agency consent form** are completed by the client. The third step to entering the Pathways program includes CHWs working with clients to complete the **client profile information** and an **initial adult checklist** to collect baseline client demographic, background and health information. Lastly, Pathways are opened based on client needs identified from step three above and the **prevention tool** and the Patient Activation Measure (PAM) tool are completed signaling the **enrollment** of the client into the program.

⁸ Eligibility requirements include low income, two or more risk factors for chronic disease, and two or more social factors such as food assistance, housing assistance, medication assistance, clothing assistance, utilities assistance, and many more (Source: program documents).

⁹ Personal communication with A. Sutton ("Adult Pathways Client Status"- This document lists the eligibility requirements and outlines the adult Pathways enrollment process).

After the client has been processed through the program and received the services they need (i.e. completed applicable “Pathways”) to the extent appropriate, s/he proceeds through the **client discharge process**. Under current arrangements, the client is discharged from the program if any of the following happens:

- all assigned Pathways are completed;
- client is lost to follow up (no contact for 60 days);
- client moves out of service area;
- client refuses services;
- client dies; and/or
- other reasons (not specified in the dataset).

A total of 757 adults participated in the Pathways Program between July 2015 and June 2017, and 614 of these participants reached the enrollment stage in the program. This is an increase from the 177 and 382 individuals reported in the first six-month report and the 18-month report, respectively. As of June 2017, only one (1) client was found to be ineligible, 60 individuals had been referred to the program and were still to be screened for eligibility, 82 individuals had passed the eligibility screen (but had not yet been enrolled), and a total of 614 adults had been enrolled into the program since inception. A total of 536 clients had been discharged from the program. Table 3 shows the distribution of the clients who had participated in the program since its inception, as of June 2017.

Table 3: Client enrollment status, as of June 30, 2017

| Enrollment Status | Frequency | Percent |
|--|------------------|----------------|
| Referral – Client has been referred to the program through canvassing, managed care organizations, and other external agencies | 60 | 7.9 |
| Eligible – Client is active. Eligibility screening tool completed and client meets the requirements for the program | 82 | 10.8 |
| Enrolled – Client is active and all enrollment steps completed | 614 | 81.1 |
| Ineligible - Client is active. Eligibility screening tool completed and client does not meet the requirements for the program | 1 | 0.1 |
| Total | 757 | 100 |

Of the 757 adults, 651 adults had been assigned at least one Pathway by June of 2017. Pathways assigned to an individual adult ranged from one Pathway to as many as 39 Pathways. The median

number of Pathways was four and the modal number was three Pathways. The Pathways most frequently used were the Social Service Referral, Medical Referral, Education, Medical Home, Housing, Medication Assessment, and Health Insurance, in descending order. Table 4 provides a summary of the frequency of use of different Pathways and the Pathway completion status since the beginning of the program. This table excludes Pathways associated with clients who could not complete their identified Pathways because they were ineligible or, had not yet enrolled, as well as individuals who had been discharged due to various reasons including lost eligibility, death, moving out of area, not being impactable/non-compliant (as defined by HUB Program staff), requesting discharge, and being unable to locate.

Table 4: Pathway completion status and Pathway frequency of use

| Pathway | Pathways Completion Status | | | |
|-------------------------|-----------------------------------|----------------------------|------------------|--------------------|
| | Ongoing | Finished Incomplete | Completed | Grand Total |
| Social Service Referral | 237 | 465 | 758 | 1,460 |
| Medical Referral | 124 | 203 | 475 | 802 |
| Education | 15 | 19 | 332 | 366 |
| Medical Home | 33 | 80 | 74 | 187 |
| Housing | 77 | 71 | 19 | 167 |
| Medication Assessment | 39 | 72 | 42 | 153 |
| Health Insurance | 27 | 75 | 50 | 152 |
| Smoking Cessation | 9 | 57 | 3 | 69 |
| Adult Education | 11 | 47 | 5 | 63 |
| Employment | 13 | 31 | 6 | 50 |
| Behavioral | 3 | 14 | 2 | 19 |
| Medication Management | 3 | 9 | 3 | 15 |
| Family Planning | - | 7 | 3 | 10 |
| Immunization Referral | - | 1 | 0 | 1 |
| Lead | 1 | - | 0 | 1 |
| Total | 592 | 1,151 | 1,772 | 3,515 |

Out of a total of 3,515 Pathways that had been assigned to individual clients, a total of 1,772 (50.4%) Pathways had been completed and 1,151 (32.7%) were finished incomplete while the remaining 592 (16.8%) Pathways were still being worked on by the individual clients. The Social Service Referral category had the highest frequency in usage and further analysis showed the services that were most frequently used in that Pathway category were Food Assistance, Transportation Assistance, Clothing Assistance, and Other, in descending order as shown in Table 5.

Table 5: Social Services Referral Pathway by specific service and frequency of use

| Service | Count of Client Id | Percent (%) |
|-------------------------------|---------------------------|--------------------|
| Food Assistance | 393 | 27.2 |
| Transportation Assistance | 208 | 14.4 |
| Clothing Assistance | 178 | 12.3 |
| Other | 172 | 11.9 |
| Legal Assistance | 89 | 6.2 |
| Utilities Assistance | 88 | 6.1 |
| Housing Assistance | 59 | 4.1 |
| Financial Assistance | 56 | 3.9 |
| Starting Fresh | 36 | 2.5 |
| Insurance Assistance | 28 | 1.9 |
| Medication Assistance | 24 | 1.7 |
| Furniture Assistance | 19 | 1.3 |
| Housing | 19 | 1.3 |
| Education Assistance | 15 | 1.0 |
| Child Assistance | 9 | 0.6 |
| Job/Employment Assistance | 8 | 0.6 |
| Medical Debt Assistance | 8 | 0.6 |
| Translation Assistance | 8 | 0.6 |
| Food Assistance / WIC | 7 | 0.5 |
| Tobacco/Smoking Cessation | 4 | 0.3 |
| Clothing/Baby Items | 3 | 0.2 |
| Diaper Bank | 2 | 0.1 |
| Domestic Violence Assistance | 2 | 0.1 |
| Furniture | 2 | 0.1 |
| WIC | 2 | 0.1 |
| Baby Items | 1 | 0.1 |
| Cribs for Kids | 1 | 0.1 |
| Help Me Grow/Early Head Start | 1 | 0.1 |
| Salvation Army | 1 | 0.1 |
| Total | 1443 | 100 |

Pathway assignments for food, clothing, and transportation comprise about 53.9% of the total Social Service Pathways assignment. The services used less frequently include Diaper Bank, Domestic Violence Assistance, Furniture Assistance, WIC Baby Items, Cribs for Kids, Help Me Grow/Early Head Start, and Salvation Army. Services which were combined under the group “Other” had a frequency of 11.9% (172 referrals) of the Social Service Pathways assigned since the program started. However, the database made available for evaluation purposes does not specify the “Other” services to which they were referred.

Table 6 presents a summary of frequencies of individuals according to the degree to which they have completed the Pathways assigned to them across all Pathway categories. During the first 18 months, about 46% had completed at least half of the Pathways assigned to them and almost 34% had completed less than a quarter of all Pathways identified for them. About 11% had not completed any of their assigned Pathways and these individuals had been in the program for a median time of 56 days. After 24 months, these figures have not changed greatly. For example, as of June 30th, slightly less than 44% had completed at least half of their assigned Pathways and about 11% had not completed any of their assigned Pathways. Neither of these figures were substantially different than the figures reported in Table 6 for the 18-month time period.

Additionally, for the 24-month period, the median duration for completing all assigned Pathways was 126 days. Among the 73 individuals who had completed zero Pathways after 24 months of operation, 53 of them had been in the program for 60 days or less and the other 20 individuals have been in the program for more than 60 days.

Table 6: Pathways completion status

| Pathway Completion Status | After 18 months | | | After 24 months | | |
|---------------------------|-----------------|-------------|------------------------|-----------------|-------------|------------------------|
| | Frequency | Percent (%) | Median Duration (days) | Frequency | Percent (%) | Median Duration (days) |
| Zero Pathways Completed | 45 | 11.0 | 56 | 73 | 11.2 | 114 |
| Less or equal 25% | 95 | 22.7 | 87 | 160 | 24.6 | 95 |
| Between 25% and 50% | 83 | 19.9 | 118 | 134 | 20.6 | 127 |
| Between 50% and 75% | 103 | 24.6 | 123 | 143 | 22.0 | 136.5 |
| More than 75% | 49 | 11.7 | 157 | 77 | 11.8 | 192.5 |
| Completed all | 42 | 10.1 | 111 | 64 | 9.8 | 126 |
| Total | 418 | 100 | | 651 | 100 | |

Overall, these findings suggest that multiple individuals from the community are benefiting from the Adult Pathways Program. During the first six months of the program (from July 2015 through December 2015), a total of 55 individuals had been assigned at least one Pathway, and a year later, 418 individuals had been assigned at least one Pathway, indicating an increase of about 585%. After 24 months, 651 individuals had been assigned at least one Pathway indicating a significant growth of the program over the two-year period. However, the percentage of individuals who had completed all of their identified Pathways -- 10.1% during the first 18 months and 9.8% after 24

months -- remains low. The relatively low number of individuals who successfully complete all of their identified Pathways indicates that continued effort should be targeted toward helping individuals complete all their assigned Pathways.

Comparison to Previous Evaluation Findings

- There has been a significant increase in participants in the program over the past 24 months from 177 during the first six months to 487 participants after 18 months and then 757 after 24 months.
- The most frequently used Pathways have remained the same over the same period, and these include Social Services, Medical Referrals, and Education Pathways.
- During the six-month period between December 2016 to June 2017, the use of the Social Services Referral Pathway and the Medical Referral Pathway increased by more than 160% each (from 524 shown in the last Evaluation Report to 1,460 reported in Table 4 above for the Social Services Pathway, and from 304 to 804 for the Medical Referral Pathway), while the Education Pathway increased by about 80% (from 203 to 366) during the same period.
- There is an increase in the number of individuals who have completed all Pathways from 42 individuals after 18 months of the program to 64 individuals after 24 months.

Implications for Program Management

- The program is steadily growing as evidenced by the number of individuals who have participated in the program.
- The Medical Referral Pathway, the Education Pathway, and the Social Services Referral Pathway appear to comprise a significant proportion of Pathways opened. As a result, particular attention to assuring that referrals and support relating to their implementation may be appropriate.
- Social services (within the Social Service Pathway) that are classified as “Other” continue to be rather frequently assigned. Since our last report (for data entered through December 2016), we notice that the Program staff have defined entries within this “Other” category more specifically. A list of these newly clarified entries is attached as Appendix 3 to this report.
- Pathway completion numbers in our dataset are improving in comparison to previous

reports. Even so, there may be value in continuing to identify barriers to Pathway completion in order to help clients complete their Pathways.

- In particular, there may be some value in assessing and targeting additional assistance to clients who are having particular difficulty in completing Pathways, as exemplified by those clients who have not yet completed more than 25% of their assigned Pathways.
- Program managers may also find value in following up with those individuals (and/or the CHWs who assist them) who have been in the program for more than 60 days and have not shown progress in completing Pathways.

Evaluation Question 4

How does client readiness to improve health change over time for clients participating in the Adult Pathways Program?

The Patient Activation Measure (PAM) has been used widely to help predict the degree to which clients are activated to manage their health and health care. It can also be used to assess the progress of interventions in building client health self-management capabilities. The PAM score is a tool used to measure the skills, knowledge, beliefs and behaviors that combine to create an activated individual (Hibbard et al, 2005)¹⁰. Individuals with high PAM scores have been shown to be more likely to perform self-management behaviors, use self-management services, and report high adherence to medication compared to those with lower PAM scores (Mosen et al, 2007)¹¹. The PAM score is measured on a theoretical 0 to 100 scale (0 = lowest activation, 100 = highest activation) and in this evaluation report, the scores are categorized as defined in a peer reviewed article by Greene et al (2015)¹². Table 7 gives a summary of the different PAM levels, score cut off points, and associated descriptions, based on the categories drawn from this article (Greene et al, 2015).

Table 7: PAM levels and their description

| Level | Score Range | Description |
|-------|-------------|---|
| 1 | 0.0 – 47.0 | Individuals become self-aware of their behaviors and symptoms. |
| 2 | 47.1 – 55.1 | Individuals begin to develop the knowledge, skills and confidence needed to master new self-management competencies. |
| 3 | 55.2 – 72.4 | Individuals initiate new health promoting behavior(s) and work to further refine techniques to monitor and adjust. |
| 4 | 72.5 - 100 | Individuals strive to maintain desired health-related behaviors over time and learn to anticipate difficult situations that will arise. |

¹⁰ Hibbard, J. H., Mahoney, E. R., Stockard, J., & Tusler, M. (2005). Development and testing of a short form of the patient activation measure. *Health Services Research*, 40(6p1), 1918-1930.

¹¹ Mosen, D. M., Schmittiel, J., Hibbard, J., Sobel, D., Remmers, C., & Bellows, J. (2007). Is patient activation associated with outcomes of care for adults with chronic conditions? *The Journal of Ambulatory Care Management*, 30(1), 21-29.

¹² Greene, J., Hibbard, J. H., Sacks, R., Overton, V., & Parrotta, C. D. (2015). When patient activation levels change, health outcomes and costs change, too. *Health Affairs*, 34(3), 431-437.

A total of 656 adults in the Pathways database had available baseline PAM scores at the time of this report. For this group, the minimum PAM score was 20.5 and the maximum was 100. The median PAM score was 53.2, and the mean was 57.6. As of June 2017, 169 individuals had a second PAM score recorded, an increase from 114 individuals reported as of December 2016. This drop in the availability of PAM score data from baseline to the second PAM score may be because some clients do not participate for more than three months in the program and thus may not reach a point in time where a second PAM score is recorded. Reasons for discharge before the second PAM test is taken included having completed their Pathways, lost-to-follow up, and/or being unable to locate. Among the group of clients who have taken more than one PAM test, the average (mean) PAM score for their second test was 57.9, which is slightly more than the average baseline PAM Score which the clients earned as they entered the program. Additionally, only 47 clients had a third PAM Score (PAM Score 3) recorded and their average score was 61.5 which is also more than the baseline average PAM score. Table 8 gives a summary of these PAM score results.

Table 8: Summary statistics for PAM Scores

| Description | Baseline PAM | PAM Score 2 | PAM Score 3 | PAM Score 4 | PAM Score 5 |
|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
| N | 656 | 169 | 47 | 6 | 1 |
| Mean | 57.6 | 57.9 | 61.5 | 54.9 | 65.5 |
| Median | 53.2 | 53.2 | 60.6 | 54.4 | 65.5 |
| Minimum | 20.5 | 34.2 | 40.7 | 51.0 | 65.5 |
| Maximum | 100.0 | 100.0 | 100.0 | 60.6 | 65.5 |
| Std. Deviation | 14.1 | 13.5 | 13.9 | 3.9 | . |

Further statistical analysis¹³ comparing clients with multiple PAM scores over time (i.e. paired PAM scores) showed that there is no statistically significant difference between paired PAM scores. No differences were noted between PAM Score 1 and PAM Score 2; between PAM Score 1 and PAM Score 3; and between PAM Score 2 and PAM Score 3. This generally shows that, as measured by the PAM scores, there does not appear to be significant improvement over time in clients' readiness to improve their health. PAM scores 4 and 5 were excluded from further analysis due to their very low sample size.

¹³ Paired samples t-tests were used to test for the difference between means for paired PAM scores. The hypothesis in each case was: There is a difference between paired PAM scores. At the 5% level of significance, there were no significant statistical differences between different paired PAM scores.

Comparison to Previous Evaluation Findings

- In the first report, 151 clients had baseline PAM measures. This client count increased to 425 after 18 months, and now there are 656 clients with baseline PAM score measures.
- Additionally, there are now 169 individuals with more than one PAM score and 47 persons with 3 or more PAM score measure, which allows assessment of trends in readiness to improve client health over time. This represents a significant increase in the number of individuals with multiple PAM scores.
- With these additional data, it appears that PAM scores are now increasing marginally over time, but the differences found do not (at least yet) show statistical significance. Even so, with these additional data, this trend is now closer to what might be expected and sought after by program managers.

Implications for Program Management

- Program leadership should consider continuing to monitor PAM score data to determine if there are any further changes with respect to PAM scores over time.
- Program leadership may also want to investigate educational and engagement processes used by CHWs in the program to ascertain whether there might be alternative ways that yield greater levels of patient activation (as measured by PAM scores) by program clients.
- Because the measured PAM scores appear to suggest that there is no statistically significant client activation due to program impact, program leadership may also want to continue ascertaining the extent to which this measure appropriately reflects what they are trying to accomplish with the program.

Evaluation Question 5

Does a high level of client readiness to improve health increase the likelihood that a client will successfully complete health improvement Pathways recommended by the CHW assisting them?

When clients are assigned to Pathways, they start working to complete them in collaboration with their CHW. The CHW is in contact with the client to help them navigate through various barriers that may hinder them in accessing health care and social services. As discussed in Evaluation Question 3, the number of Pathways assigned to clients range widely and clients are expected to complete each of their assigned Pathways. In order to assess how the level of client readiness to improve health affects the likelihood that a client will successfully complete the health improvement Pathways recommended by the CHW assisting them, a cross tabulation of Pathway completion status versus mean PAM scores (where available) at each defined level of Pathway completion was performed. Table 9 shows the results from the cross-tabulation.

Table 9: Mean PAM scores according to level of Pathways completion

| Pathways Completion Status | Baseline PAM Score N = 660 Mean (SD) | PAM Score 2 N = 169 Mean (SD) | PAM Score 3 N = 47 Mean (SD) |
|--|---|--|---|
| Zero Pathways completed | 53.8 (10.2) | . | . |
| Completed less than 25% of identified Pathways | 58.2 (13.8) | 60.0 (14.5) | 61.1 (10.2) |
| Completed between 25% and 50% of identified Pathways | 58.6 (14.3) | 56.5 (13.3) | 61.4 (11.6) |
| Completed between 50% and 75% of identified | 57.4 (13.5) | 56.6 (10.7) | 61.2 (16.1) |
| Completed between 75% and less than 100% of identified Pathways | 56.9 (15.6) | 57.6 (14.1) | 58.3 (10.4) |
| Completed all Pathways | 57.9 (16.7) | 62.2 (15.5) | 74.7 (20.3) |

Note: Two clients had completed four PAM score test offerings but are not included in the table above.

It is worth noting that very few individuals had fourth PAM scores. It is possible that some individuals could have exited the program before they had reached the point where fourth PAM scores could be recorded.

The chronological trends for the various Pathway Completion Status categories shown in Table 9 vary. For the two middle categories reflecting completion of between 25% and 75% of assigned pathways, PAM scores fluctuate (go up and down) across the first three PAM scores recorded. However, for those who have completed few (< 25%) or most/all (>75%) of their assigned Pathways, there appear to be gradual increases in mean PAM scores over time. However, these changes do not achieve statistical significance.¹⁴

Comparison to Previous Evaluation Findings

- During the period between January and June 2017, there was a notable increase in the numbers of clients with PAM score data in the Pathways database. With this increase in sample size, we were able to carry out multiple comparisons of Pathway Completion Status and distributions of PAM scores. While previous evaluation reports showed no evidence of a relationship between Pathway Completion Status and recorded PAM scores, the figures in Table 9 provide more mixed – but still inconclusive – results across multiple Pathways Completion Status categories.

Implications for Program Management

- Program leadership should consider continuing to collect, analyze, and monitor PAM and Pathway Completion Status data to determine whether or not there is a clear relationship between Pathway completion and PAM scores.

¹⁴ While the overall trend among those who have completed all of their pathways appears to be toward PAM scores increasing over time, paired sample t-tests across PAM Score assessments over time (PAM Score assessments 0, 1, and 2) did not achieve statistical significance.

Evaluation Question 6

For at least one identified Pathway, to what extent are clients successful in navigating the identified follow up Pathway actions to completion as a means of improving their health status?

In order to address this question, we focused on the Medical Home and the Social Services Referral Pathways. These Pathways were analyzed in detail in terms of their completion rates, individual Pathway duration, and total individuals assigned to the particular Pathway to date. Table 10 presents a summary of the total number of Medical Home and Social Service Referral Pathways assigned to date (total Pathways), percent completed for each Pathway, and median duration for different Pathways for the first six months, after eighteen months, and after 24 months. Table 11 presents a summary of Social Services Referral Pathway services being compared across the first six months, after 18 months, and after 24 months. Table 12 provides information on Social Services Referral Pathways that were initiated after the first six-month report.

Table 10: Comparison of Pathway completion rates over time for the Medical Home and Social Services Referral Pathways

| Pathway | First six months | | | After one and half years | | | After two years | | |
|----------------------|-----------------------------|--------------------------|-------------------------------------|-----------------------------|--------------------------|-------------------------------------|-----------------------------|--------------------------|-------------------------------------|
| | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) |
| Medical Home Pathway | 46 | 26.1 | 18 | 116 | 35.3 | 21 | 189 | 39.7 | 27 |
| SSR Pathways | 162 | 48.1 | 12 | 819 | 53.2 | 8 | 1515 | 52.1 | 7 |
| Summary | | | | | | | | | |

^aCumulative number of pathways assigned to individuals since beginning of the program.

^bPercentage of pathways completed when compared to total Pathways assigned to that date.

^cThe median number of days taken to complete the specific Pathway.

After 24 months of program implementation, about 40% and 52% of assigned Medical Home and Social Services Referral Pathways had been completed, respectively. This reflected an increase for the Medical Home Pathway and a slight decrease for the Social Services Referral Pathway. By contrast, the median number of days (duration) to Pathway completion for the Social Services Pathway was reduced to 7 days (from 8 days), and the median number of days until Pathways completion for the Medical Home Pathway increased to 27 days (from 21 days). Table 10 summarizes these results, and provides a historical summary of previously reported information.

Table 11: Detailed breakdown of Social Services Referral Pathways

| Pathway | First six months | | | After one and half years | | | After two years | | |
|---------------------------|-----------------------------|--------------------------|-------------------------------------|-----------------------------|--------------------------|-------------------------------------|-----------------------------|--------------------------|-------------------------------------|
| | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) | Total Pathways ^a | Completed ^b % | Median Duration ^c (days) |
| Food Assistance | 33 | 57.6 | 7 | 216 | 62.0 | 4 | 403 | 66.8 | 2 |
| Utilities Assistance | 19 | 68.4 | 9 | 48 | 47.9 | 9 | 96 | 50 | 7 |
| Clothing Assistance | 19 | 47.4 | 9 | 128 | 46.1 | 2 | 183 | 53.0 | 1 |
| Legal Assistance | 15 | 6.7 | 23 | 36 | 27.8 | 4 | 89 | 20 | 6 |
| Transportation Assistance | 15 | 46.7 | 42 | 108 | 54.6 | 10 | 215 | 44.7 | 14 |
| Financial Assistance | 5 | 20.0 | 74 | 31 | 35.5 | 13 | 75 | 50.7 | 14 |
| Food Assistance / WIC | 5 | 100 | 3 | 7 | 100 | 3 | 7 | 100 | 3 |
| Education Assistance | 3 | 100 | 32 | 5 | 100 | 32 | 15 | 66.7 | 29 |
| Job/Employment Assist. | 2 | 50.0 | 29 | 6 | 50.0 | 3 | 8 | 37.5 | 3 |
| Other | 27 | 48.2 | 15 | 128 | 58.6 | 10 | 175 | 57.7 | 14 |
| Housing Assistance | 14 | 35.7 | 3 | 36 | 36.1 | 18 | 60 | 26.7 | 20 |
| Insurance Assistance | 3 | 33.3 | 1 | 9 | 55.6 | 8 | 29 | 41.4 | 15 |

^aCumulative number of Pathways assigned since beginning of the program.

^bPercentage of Pathways completed when compared to total Pathways assigned to that date.

^cThe median number of days taken to complete the specific Pathway.

Table 11 summarizes specific Social Services Pathway assignments, completion rates, and median days to completion after two years of program operation. It also provides summaries of previously reported information in these areas for time periods corresponding to 6 and 18 months of program operations, respectively. While the number of Pathways assigned increased for all but one service area within the Social Services Pathway category (Food Assistance/WIC), changes in completion rates and median durations to completion were mixed across service areas. It is worth noting, however, that the following Pathways experience completion rates of less than 50%: Legal Assistance, Transportation Assistance, Job/Employment Assistance, and Housing Assistance. In addition, both Education Assistance and Housing Assistance are characterized by median durations to completion that equal or exceed 20 days. Readers can peruse the table for more detailed information.

Table 12: Detailed breakdown of Progress on Social Services Referral Pathways that were not used within first six months of program

| Pathway | After one and half years | | | After two years | | |
|---------------------------|--------------------------|-------------|------------------------|-----------------|-------------|------------------------|
| | Total Pathways | Completed % | Median Duration (days) | Total Pathways | Completed % | Median Duration (days) |
| Medical Debt Assistance | 5 | 40.0 | 1 | 8 | 37.5 | 1 |
| Furniture Assistance | 5 | 40.0 | 7 | 19 | 57.9 | 11 |
| Starting Fresh | 19 | 47.4 | 35 | 36 | 41.7 | 24 |
| Translation Assistance | 8 | 75.0 | 2 | 8 | 75.0 | 2 |
| Salvation Army | 2 | 0 | - | 1 | 0 | - |
| Cribs for Kids | 1 | 100 | 87 | 1 | 100 | 87 |
| Tobacco/Smoking Cessation | 3 | 0 | - | 5 | 0 | - |
| Clothing/Baby Items | 3 | 66.7 | 17 | 3 | 66.7 | 17 |
| Medication Assistance* | 6 | 83.3 | 2 | 24 | 83.3 | 4 |
| Child Assistance* | 3 | 66.7 | 17 | 9 | 66.7 | 12 |

^aCumulative number of individuals who have been assigned to the specific Pathway since beginning of program.

^bPercentage of individuals who have completed specific Pathways when compared to total Pathways assigned to that date.

^cThe median number of days taken to complete the specific Pathway.

*Only one Pathway was assigned in the first six months and it was never completed and thus no median duration was calculated during that period.

Table 12 displays Social Services Pathway Service assignments, completion rates, and median days to completion for Social Service Pathways service areas that were not in place at the inception of the program. While the total Pathways assigned in each of these areas increased or stayed the same between January and June 2017, changes in completion rates and median days to completion varied across service areas. However, after 24 months of Pathways Program operation, completion rates in the following service areas remain lower than 50%: Medical Debt Assistance, Starting Fresh, Salvation Army, and Tobacco/Smoking Cessation. In addition, Starting Fresh and Cribs for Kids are characterized by median days to completion that exceed 20 days.

Comparison to Previous Evaluation Findings

Overall, a comparison over the three reporting periods (6 months, 18 months, and 24 months) shows:

- The Pathway completion rate for the Medical Home Pathway is showing continuing signs of improvement, while the percentage of Pathway completion for Social Service Referrals appears to be leveling off.
- The Medical Home Pathway median duration has steadily increased, while the aggregate social services Pathway mediation duration has decreased – thus reflecting some level of improvement.
 - Within the Social Services Pathway, however, there are mixed trend results evident for varying kinds of social services (see Tables 11 and 12).

Implications for Program Management

- Program managers should continue with their efforts to enhance rates of Pathway completion. Improvements in Pathway completion rates since the first six months of the program are evident for both the Medical Home and Social Service Referral Pathways. In the former case (Medical Home Pathway), additional improvements are evident between 18 months and 24 months of program operation.
 - Among the Social Services Referral Pathway service areas, services that may benefit from further efforts to increase completion rates include legal assistance, transportation assistance, Job/employment assistance, housing assistance, insurance assistance, Medical Debt Assistance, and Starting Fresh – all of which have completion rates of less than 50% after 24 months.
- Programs managers may also want to takes steps to analyze and possibly reduce increasing median duration times for the Medical Home Pathway, along with relevant Social Service Referral Pathway service areas such as education assistance, housing assistance, and Starting Fresh – all of which have completion rates of less than 50% after 24 months of program operation.

Evaluation Question 7

What factors appear to contribute to Adult Pathways clients' successful completion of the identified Pathways?

One can see from the responses to Question 3 above that there is variation in the extent to which clients complete the Pathways that are assigned to them. Individual clients complete Pathways at different rates, and in this section, we seek to understand and explain why some clients are quick to complete their Pathways while others take more time to do the same. Through our analysis of this evaluation question, we identify factors that appear to contribute to Adult Pathways clients' successful completion of their assigned Pathways.

Methods

In order to assess the effects of differing variables on Pathway completion status, we use a generalized multinomial regression model. This approach differs somewhat from the ordinal regression model approach used in the second Evaluation Report covering the first 18 months of the program's operation (released July 11, 2017). We made this change in statistical analysis approach because the "proportional odds assumption", one of the assumptions which underlies proper use of the ordinal regression model, had been violated.¹⁵

In multinomial logistic regression, statistical analyses are employed based on different categories for a particular outcome variable (in this case, Pathway completion). However, this kind of model does not require that the values of the dependent variable are ordered in sequential fashion, as is the case for an ordinal regression model. Rather, in multinomial regression, a "reference" value is identified, and the likelihood of clients falling into alternative categorical values of that variable are compared to this reference value. For the multinomial logistic regression model that we estimate, we use the completion of "less than 50% of assigned Pathways" as the reference value, and the model estimates the likelihood that individuals with various characteristics defined by the predictor variables in the model will fall into categories with "> than 50% but < 100%" of Pathways completed

¹⁵ Briefly, this assumption requires that the impact of the independent variable(s) on the outcome variable is uniform across all categories of the outcome variable. While this assumption was satisfied in the model presented in the second report, it was violated using the June 2017 data in an ordinal regression model. In response to this situation, we employed a similar – although not identical – modeling approach, multinomial logistic regression.

and “All Pathways Completed” (ie. 100% of Pathways Completed). By estimating this kind of model, we can generate an estimate of the likelihood that various factors which may affect Pathway completion actually predict whether specific clients are likely to complete all or most of their Pathways, rather than less than half of their pathways. While this modeling approach is not identical to the Ordinal Logistic Regression approach used in the Second Evaluation Report, it can also be used to identify factors or variables that predict high levels of Pathway completion (most or all Pathways Completed) versus low levels of Pathway completion (less than 50% of Pathways Completed).

Data used in the multinomial regression analysis were downloaded in June 2017 from the Pathways HUB Database, which – as is noted previously -- is used to track client progress in the program. The data come in multiple downloads and were merged into one dataset. In total, data for 757 program participants were collected. After removing participants who had not yet met with a CHW, had a baseline PAM score of zero, had missing duration information, and other missing covariates, a total of 400 individuals were included in the final pool of clients for statistical analysis supporting our response to evaluation question 7.

Statistical Analysis

In order to describe the characteristics of the population, means and frequencies were computed for the outcome of interest and various predictor variables available to estimate the model(s). Multinomial logistic regression analysis was used to estimate the odds ratios and the 95% confidence intervals for Pathway completion status associated with the predictor variables included in the model. Data were analyzed using SAS software version 9.3 (SAS Institute Inc., Cary, NC, USA) and an alpha of 0.05 was used.

Measures

Outcome measure – Pathway Completion Status

The outcome measure for the current analysis was Pathway completion status, a categorical variable that was differentiated across those who had completed fewer than 50% of their assigned Pathways, most of their assigned Pathways (> than 50% but < 100%), and all of their assigned Pathways (100%).

We also sought to identify variables that might be likely to influence Pathways completion, based on

existing literature and our understanding of the Pathways HUB Program and its operations. In so doing, we were limited to variables which were made accessible to us through the HUB Pathways Program database. Below, we describe variables used in the multinomial logistic regression models estimated and offer hypotheses regarding their expected impacts on Pathways completion. Overall, these variables are quite similar to those included in the model estimated for the Second Evaluation Report, but they include important additional variables measuring the extent to which CHWs maintained contact with their clients in differing ways.

Independent/Predictor variables

Number of CHW-client contacts – Community Health Workers work closely with clients and they use diverse ways to contact clients. As part of their protocol in interacting with clients, CHWs do planned visits and offer support to clients via phone, as well as through email, text, and fax. Sometimes, CHWs meet clients in person while in other instances they talk to the client over the phone. CHW home visits have been shown to improve Asthma control among children and adults (Krieger, Song, & Philby, 2015¹⁶; Bryant-Stephens et al. 2016¹⁷). In this section, we use the number of in person contacts, the number of phone contacts, and other contacts (email, text, and fax) as three distinct independent variables. We hypothesize that the number and type of contact used may influence the client’s rate of Pathway completion. In general, for in person, phone contacts, and other (email, text, fax) contacts, we hypothesize that Pathway completion will tend to increase as contacts increase.

Socio-demographic Characteristics (Gender, Age, Race, Education Level) – There is reason to believe that socio-demographic characteristics may influence patient self-management care. According to Hendricks and Ragemakers, (2014)¹⁸, more highly educated people, young people, and men are more likely to be able to manage diabetes. In a related study targeting patients with high blood pressure, higher income, higher health literacy, younger age, having diabetes, and

¹⁶ Krieger, J., Song, L., & Philby, M. (2015). Community health worker home visits for adults with uncontrolled asthma: the HomeBASE Trial randomized clinical trial. *JAMA internal medicine*, 175(1), 109-117.

¹⁷ Bryant-Stephens, T., Reed-Wells, S., Canales, M., Perez, L., Rogers, M., Localio, A. R., & Apter, A. J. (2016). Home visits are needed to address asthma health disparities in adults. *Journal of Allergy and Clinical Immunology*, 138(6), 1526-1530.

¹⁸ Hendriks, M., & Rademakers, J. (2014). Relationships between patient activation, disease-specific knowledge and health outcomes among people with diabetes; a survey study. *BMC health services research*, 14(1), 393.

having fewer medications were shown to be associated with self-management knowledge, skills and confidence in self-care (Ryvicker et al, 2013)¹⁹. The Age variable was recoded into age groups as follows: 18-29 years, 29-49 years, 49-65 years, and above 65 years. Based on these previous studies, we hypothesize that higher levels of education and younger age might yield improved Pathway completion rates. We might also expect men to complete pathways at a higher rate than women.

Income – According to Woolf (2015)²⁰, higher income Blacks, Hispanics, and Native Americans have better health than members of their groups with less income. Additionally, low income adults are almost five times as likely to report being in fair or poor health as are adults with family incomes at or above 400 percent of the federal poverty level (Braveman & Egerter, 2008)²¹. Income was recoded into three categories: less than \$10,000; between \$10,000 and \$25,000 and above \$25,000. In this Pathways Program evaluation, the outcome variable is Pathway completion status and the program premise is that higher incomes may be hypothesized to yield progress towards Pathways completion.

Total Pathways –Pathways are opened based on client circumstances and needs. Ultimately, the total number of Pathways allocated per individual varies widely. Number of Pathways was recoded into three distinct groups: less or equal to three, between three and six, and more than six Pathways. It is hypothesized that individuals with fewer opened Pathways will be more likely to finish these Pathways in high proportion compared to those with many Pathways.

Baseline Patient Activation Measure (PAM) score – Patient activation captures important components of patient involvement and is defined as an individual’s knowledge, skill, and confidence for managing their health care (Hibbard et al, 2005²²). The PAM has been shown to be successful in providing a consistent and accurate way of measuring changes in patient activation

¹⁹ Ryvicker, M., Feldman, P. H., Chiu, Y. L., & Gerber, L. M. (2013). The role of patient activation in improving blood pressure outcomes in Black patients receiving home care. *Medical Care Research and Review*, 70(6), 636-652.

²⁰ Woolf, S. H. (2015). How are Income and Wealth Linked to Health and Longevity?

²¹ Robert Wood Johnson Foundation, Braveman, P., & Egerter, S. (2008). *Overcoming obstacles to health: report from the Robert Wood Johnson Foundation to the Commission to Build a Healthier America*. Robert Wood Johnson Foundation.

²² Hibbard, J. H., Mahoney, E. R., Stockard, J., & Tusler, M. (2005). Development and testing of a short form of the patient activation measure. *Health Services Research*, 40(6p1), 1918-1930.

over time (Brenk-Franz et al, 2013²³, Ellins and Coulter, 2005²⁴). The PAM is used to assess the progress of interventions in building client health self-management capabilities. Individuals with high PAM scores have been shown to be more likely to perform self-management behaviors, use self-management services, and report high adherence to medication (Mosen et al, 2007²⁵; Greene et al, 2015²⁶). It was therefore hypothesized that clients' higher PAM scores would be positively associated with Pathway completion.

Number of Chronic Conditions – Most adults in the Pathways Program (91.7%) have at least two chronic conditions. In this study, it was hypothesized that adults with many chronic conditions would be motivated to manage their health, thereby increasing the likelihood of completing their Pathways. Specifically, it is believed that a greater number of chronic conditions will be positively associated with clients' Pathway completion status.

Time to Pathway Program Completion (Duration) – Individuals spend variable amounts of time in the Pathways Program. Some individuals quickly complete their Pathways, while others take a longer time to complete their Pathways. Time is a critical program variable as it gives program managers an idea of how long it typically takes for an average adult to complete the assigned Pathway(s). It was hypothesized that client time duration in the program will be positively associated with Pathway completion.

Results

The mean age for clients in the Pathways Program was 51.5 years (standard deviation = 14.7). Overall, the adults were predominantly female, Black/African American, single, had annual income less than \$10,000, and a plurality were high school graduates. A plurality of the clients (38.5%) had PAM scores in category 3 (52.2-72.4). The average number of inperson contacts and phone contacts were 2.5 (SD = 2.7) and 3.8 (SD = 4.5), respectively. Also, clients had an average of 6 (SD =

²³ Brenk-Franz, K., Hibbard, J. H., Herrmann, W. J., Freund, T., Szecsenyi, J., Djalali, S., ... & Schneider, N. (2013). Validation of the German version of the Patient Activation Measure 13 (PAM13-D) in an international multicentre study of primary care patients. *PloS one*, 8(9), e74786.

²⁴ Ellins, J., & Coulter, A. (2005). How engaged are people in their health care. *Findings of a national telephone survey*. London.

²⁵ Mosen, D. M., Schmittdiel, J., Hibbard, J., Sobel, D., Remmers, C., & Bellows, J. (2007). Is patient activation associated with outcomes of care for adults with chronic conditions? *The Journal of Ambulatory Care Management*, 30(1), 21-29.

²⁶ Greene, J., Hibbard, J. H., Sacks, R., Overton, V., & Parrotta, C. D. (2015). When patient activation levels change, health outcomes and costs change, too. *Health Affairs*, 34(3), 431-437.

5.1) Pathways assigned to them. See Table 13 for a summary of characteristics of low income adults with chronic conditions in our statistical analysis sample of the Pathways HUB Program patient population in Lucas County, as of June 2017.

Table 13: Adult Pathways client characteristics (n=400)

| Variable | Frequency |
|---|------------------|
| Age (mean, std) | 51.5 (14.7) |
| Number of Chronic Conditions (mean, std) | 5.5 (3.5) |
| Total number of Pathways (mean, std) | 6.0 (5.1) |
| Duration in Program in Days (mean, std) | 155.7 (100.4) |
| Number of in person contacts (mean, std) | 2.5 (2.7) |
| Number of phone call contacts (mean, std) | 3.8 (4.5) |
| Other contacts (mean, std) | 1.2 (2.9) |
| Gender (n,%) | |
| Male | 136 (34.0) |
| Female | 264 (66.0) |
| Race (n,%) | |
| Black/African American | 236 (59.0) |
| White | 147 (36.8) |
| Other | 17 (4.2) |
| Age Range (years) (n,%) | |
| 18-29 | 37 (9.2) |
| 29-49 | 115 (28.8) |
| 49-65 | 189 (47.2) |
| Above 65 | 59 (14.8) |
| Total Number of Pathways (n,%) | |
| Less or equal to 3 | 139 (34.8) |
| Between 3 and 6 | 135 (33.8) |
| More than 6 | 126 (31.5) |
| PAM Score (Baseline) (n,%) | |
| Level 1 | 83 (20.8) |
| Level 2 | 100 (25.0) |
| Level 3 | 154 (38.5) |
| Level 4 | 63 (15.8) |
| Highest Level of Education (n,%) | |
| Less than High School Graduate | 127 (31.8) |
| High School Graduate | 148 (37.0) |
| Some College | 80 (20.0) |
| College Graduate | 45 (11.3) |
| Average Annual Income (n,%) | |
| Less or Equal \$10,000 | 229 (57.3) |
| Between \$10,000 and \$25,000 | 150 (37.5) |
| More than \$25,000 | 21 (5.3) |
| Marital Status (n,%) | |
| Single | 220 (55.0) |

| | |
|--------------------|-----------|
| Married/Cohabiting | 61 (15.3) |
| Separated/Divorced | 90 (22.5) |
| Widowed | 29 (7.3) |

As shown in Table 14, we find that 240 clients (48.7% of the total) had completed less than 50% of their Pathways, 196 clients had completed between 50 and 100% of their Pathways (39.7%), and 57 clients had completed all of their Pathways (11.6%).

Table 14: Pathways status by days in program

| Pathway Status | Frequency | Percent |
|-------------------------------|-----------|---------|
| Less than 50% completed | 197 | 49.25 |
| Between 50% and < 100% | 160 | 40.00 |
| Completed all Pathways (100%) | 43 | 10.75 |

Multinomial Logistic Regression Analysis

As is noted above, multinomial regression analysis was used to evaluate the influence of various predictor variables on the extent of Pathways completion. Two types of multinomial regression estimates were developed. Bivariate multinomial logistic regression was performed for potential determinants of Pathway completion. In these statistical analyses, we essentially analyzed the relationship between each predictor variable in Table 13 and the extent to which it was associated with progress in Pathways completion, *without controlling for other variables*. The results from this form of analysis are shown in Table 15. This unadjusted modeling approach shows that in person contacts, other contacts, the number of chronic conditions, client duration in program, age, number of Pathways assigned, baseline PAM score, highest level of education, and marital status are significant bivariate predictors of the extent of Pathway completion.

Table 15: Results of bivariate multinomial logistic regression predicting Pathway completion status among adults (“unadjusted” model)

| Covariate (Client Characteristic) | Odds Ratios (95% CI)* | |
|-----------------------------------|-------------------------|--------------------------|
| | >50% but less than 100% | All Pathways Completed |
| Duration in program | 1.006 (1.003 1.008) ** | 1.003 (0.999 1.006) |
| Number of Chronic Conditions | 1.099 (1.033 1.170) ** | 1.074 (0.977 1.180) |
| Number of in person contacts | 1.298 (1.164 1.447) ** | 1.288 (1.126 1.473) ** |
| Number of phone call contacts | 1.048 (0.998 1.100) | 0.986 (0.899 1.082) |
| Number of “other” contacts | 0.924 (0.835 1.023) | 0.517 (0.329 0.810) ** |
| Gender | | |
| Male | Ref | Ref |
| Female | 0.873 (0.561 1.358) | 0.719 (0.364 1.420) |
| Race | | |
| Black/African American | Ref | Ref |
| White | 1.476 (0.950 2.293) | 1.476 (0.746 2.920) |
| Other | 0.845 (0.296 2.412) | 0.517 (0.063 4.226) |
| Age range (years) | | |
| 18-29 | Ref | Ref |
| 29-49 | 1.436 (0.625 3.301) | 4.269 (0.524 34.739) |
| 49-65 | 2.760 (1.253 6.082) ** | 7.062 (0.907 54.970) |
| Above 65 | 3.052 (1.220 7.637) ** | 10.174 (1.196 86.539) ** |
| Total Number of Pathways | | |
| Less or equal 3 | Ref | Ref |
| Between 3 and 6 | 20.92 (1.199 3.650) ** | 0.442 (0.200 0.976) ** |
| More than 6 | 6.471 (3.640 11.502) ** | 0.602 (0.240 1.508) |
| PAM Score (Baseline) | | |
| Level 1 | Ref | Ref |
| Level 2 | 0.480 (0.257 0.897) ** | 0.579 (0.209 1.603) |
| Level 3 | 0.617 (0.349 1.091) | 0.857 (0.349 2.104) |
| Level 4 | 0.698 (0.347 1.401) | 0.855 (0.283 2.581) |
| Highest level of education | | |
| Less than High School Graduate | Ref | Ref |
| High School Graduate | 1.078 (0.648 1.790) | 1.060 (0.499 2.251) |
| Some College | 0.463 (0.249 0.863) ** | 0.418 (0.512 1.149) |
| College Graduate | 1.045 (0.516 2.113) | 0.330 (0.070 1.553) |
| Income | | |
| Less or equal to \$10,000 | Ref | Ref |
| Between \$10,000 and 25,000 | 1.214 (0.782 1.884) | 1.272 (0.644 2.509) |
| More than \$25,000 | 1.088 (0.432 2.739) | 0.443 (0.055 3.597) |

| | | |
|-------------------------|---------------------|-------------------------|
| Marital Status | | |
| Single | Ref | Ref |
| Married/Living together | 1.589 (0.845 2.990) | 4.321 (1.825 10.232) ** |
| Separated/Divorced | 0.878 (0.520 1.484) | 1.343 (0.556 3.245) |
| Widowed | 2.241 (0.937 5.359) | 4.062 (1.209 13.646) ** |

* The reference category in the multinomial logistic regression model is “≤ 50% Pathways completed”

** Confidence intervals are significant at 95% level, and the “**” indicates that the variables with which it is associated are statistically significant in relation to the confidence intervals presented.

The second kind of model estimated was a multi-variable analysis that estimates the impact of each predictor variable on the extent of Pathway completion, *controlling for the other variables* included in the model. The results from this adjusted model are shown in Table 16.

Table 16: Results of multi-variable multinomial logistic regression predicting Pathway completion status among adults (“adjusted” model)

| Covariate (Client Characteristic) | Multivariable/Adjusted Model OR (95% CI)* | |
|-----------------------------------|---|----------------------------|
| | >50% but less than 100% (1) | All Pathways Completed (2) |
| Duration in program | 1.002 (0.999 1.005) | 1.002 (0.998 1.007) |
| Number of Chronic Conditions | 1.051 (0.976 1.132) | 1.077 (0.959 1.209) |
| Number of in person contacts | 1.260 (1.084 1.464)** | 1.462 (1.214 1.761)** |
| Number of phone call contacts | 0.960 (0.902 1.022) | 0.970 (0.861 1.093) |
| Number of “other” contacts | 0.881 (0.782 0.993)** | 0.527 (0.319 0.869)** |
| Gender | | |
| Male | Ref | Ref |
| Female | 1.018 (0.604 1.715) | 0.732 (0.333 1.608) |
| Race | | |
| Black/African American | Ref | Ref |
| White | 1.315 (0.771 2.242) | 1.013 (0.444 2.309) |
| Other | 0.776 (0.235 2.558) | 0.928 (0.094 9.164) |
| Age range (years) | | |
| 18-29 | Ref | Ref |
| 29-49 | 1.236 (0.479 3.194) | 5.085 (0.546 47.311) |
| 49-65 | 2.279 (0.913 5.685) | 4.935 (0.538 45.221) |
| Above 65 | 2.120 (0.695 6.467) | 5.008 (0.470 53.374) |
| Total Number of Pathways | | |
| Less or equal 3 | Ref | Ref |
| Between 3 and 6 | 1.789 (0.956 3.347) | 0.329 (0.131 0.827)** |
| More than 6 | 4.801 (2.448 9.414)** | 0.211 (0.058 0.763)** |
| PAM Score (Baseline) | | |
| Level 1 | Ref | Ref |
| Level 2 | 0.635 (0.301 1.342) | 0.780 (0.247 2.466) |

| | | |
|--------------------------------|----------------------|-----------------------|
| Level 3 | 0.858 (0.435 1.690) | 1.252 (0.440 3.565) |
| Level 4 | 1.135 (0.502 2.566) | 2.510 (0.680 9.264) |
| Highest level of education | | |
| Less than High School Graduate | Ref | Ref |
| High School Graduate | 1.334 (0.736 2.419) | 1.057 (0.438 2.552) |
| Some College | 0.573 (0.275 1.194) | 0.619 (0.199 1.924) |
| College Graduate | 1.253 (0.537 2.920) | 0.476 (0.087 2.622) |
| Income | | |
| Less or equal to \$10,000 | Ref | Ref |
| Between \$10,000 and 25,000 | 1.094 (0.631 1.895) | 1.218 (0.533 2.784) |
| More than \$25,000 | 1.346 (0.398 4.546) | 0.120 (0.007 1.991) |
| Marital Status | | |
| Single | Ref | Ref |
| Married/Living together | 0.995 (0.459 2.160) | 3.170 (1.097 9.157)** |
| Separated/Divorced | 0.699 (0.373 1.312) | 1.221 (0.454 3.284) |
| Widowed | 2.538 (0.634 10.160) | 0.998 (0.339 2.934) |

* The reference category in the multi-variable multinomial logistic regression model is “<= 50% Pathways completed”

** Confidence intervals are significant at 95% level, and the “**” therefore indicates that the variables with which it is associated are statistically significant in relation to the confidence intervals presented.

In this adjusted model, several variables retain statistical significance, even when controlling for other variables in the model. First, according to the adjusted model results (Table 16), the number of in person contacts and the number of “other” CHW contacts both achieve statistical significance. The results provided in Table 16 suggest that as the number of in person contacts by the CHW increases (with all other variables held constant), the client becomes more likely to complete a majority or all of their Pathways in comparison to the likelihood of completing a minority of them. For each additional in person contact, we expect to see the odds of the client having completed all assigned Pathways increase by about 46%, after controlling for other variables (compared to completing a minority of assigned Pathways). Similarly, for each additional in person contact, we expect to see the odds of the client having completed a majority of assigned Pathways increase by 26%, after controlling for other variables (again, compared to completing a minority of assigned Pathways). Among the variables included in the model, in person contacts was shown to have the most consistently large and statistically significant estimated influence on Pathway completion. By contrast, as the number of “other” types of CHW

contacts (email, text, fax) increases, clients become less likely to complete a majority or all of their assigned Pathways. This latter result may reflect multiple efforts by CHWs to contact their clients when in-person meetings are difficult to schedule or complete. Overall, however, these results suggest that CHWs should work to assure that they are able to meet *in person* with their clients regularly, as this may increase the chances of Pathway completion.

Second, the results in Table 16 also suggest that the chances of a client completing a majority or all of their Pathways (in comparison to completing a minority of their Pathways) varies based on the number of Pathways assigned. Those assigned 3 to 6 or more than 6 Pathways appear less likely to complete all of their Pathways, when compared to those clients who are assigned 1 to 3 Pathways. However, the results also suggest that those clients assigned more than 6 Pathways are more likely to complete a majority of their Pathways than those who are assigned 1 to 3 Pathways. And finally, the results in Table 16 suggest that clients who are married or are living with a partner may be more likely than those who are not married or living with a partner to complete all of their Pathways (in comparison to the likelihood of completing less than half of their Pathways).²⁷

Overall, the key finding from this analysis appears to be that as the number of in person CHW contacts with a client increases, the likelihood of the client completing assigned Pathways also increases. As noted above, therefore, the results here suggest that CHWs should seek to assure frequent in person meetings with their clients in order to encourage higher rates of Pathway completion.

Comparison to Previous Evaluation Findings

- This evaluation question was addressed in the previous report but the model estimated at that time did not account for the number and types of encounters between CHW and the client.²⁸ In this report, CHW encounter variables have been incorporated into the analysis

²⁷ It is important to note, however, that this result for marital status appears sensitive to the effects of employment status. When this model was estimated with an added variable reflecting whether or not the client was employed, the statistically significant effect of marital status disappeared. The employment variable itself, while statistically significant in an unadjusted bivariate model, does not retain statistical significance in an adjusted multi-variable model which includes the variables shown in Table 16. This suggests that marital status and employment status may affect one another's influence on Pathway completion. As a result, the findings for both of these variables should be interpreted with caution at this point in time. On the other hand, the addition of employment status to the multivariable model does not appear to substantially affect the results for other variables in the multivariable model (shown in Table 16).

²⁸ In addition, accompanying this new modeling effort was a violation of a key assumption for the ordinal regression

and have revealed a notable and statistically significant relationship between the number of in person CHW contacts with the client and the extent to which clients complete their assigned Pathways.

- With the inclusion of variables reflecting the number of CHW encounters with clients, variables found to be statistically significant in the previous report have lost statistical significance in the multivariable model. While this change is notable, further research on the relationships between those variables – duration in the program, gender, and senior citizen status (age 65 or older) – is appropriate.

Implications for Program Management

- In person encounters between CHWs and clients appear to be significantly associated with higher levels of Pathway completion, and this suggests that program managers should encourage their CHWs to find ways to not only maintain contact with clients, but also meet with them in person as well.
- Additional research is appropriate to gain an improved understanding of the effects of gender, duration in the Pathways Program, marital status, and other factors on the likelihood of Pathway completion.

modeling approach used in the previous report, so the results presented above are based on a different modeling approach, multinomial logistic regression analysis.

Evaluation Question 8

Why do clients fail to complete identified Pathways?

The Medical Home and Social Services Referral Pathways were the focus of our effort to provide a response to this evaluation question. According to program documents, clients may fail to complete their identified Pathways due to various reasons. These reasons include:

- being lost to follow up (the client could not be contacted or located);
- declined further services (the client does not want to continue receiving services through the program);
- no longer living in the area;
- deceased;
- not impactable/non-compliant (the client expressed no positive change in health or compliance while enrolled in the program);
- lost eligibility (typically a client who is not compliant with eligibility requirements),
- deemed inappropriate (the Pathway Program or assigned Pathway(s) does not fit client's needs), and;
- transferred care (the client is receiving care from another agency).

Based on the available data, most clients who did not complete their assigned Medical Home or Social Services Referral Pathways failed to do so because they could not be located (about 52%) or because they declined to receive further services from the program (about 21%). For the Medical Home Pathway, the following were cited by CHWs as specific reasons for clients failing to complete Pathways:

- Client had failed to renew their Medicaid Insurance.
- Client did not have transportation.
- Client could not afford medications. However, further follow up yielded no results as the client could not be located.
- Client wanted financial help only and declined any medical help offered.
- Client never fulfilled appointments and did not return calls for continued engagement.
- Wrong Pathway had been opened for the client.

Social Services Referral (SSR) Pathways were the most frequently used Pathways. Specific reasons clients were reported by CHWs to have failed to complete their SSR Pathways include the following:

- Failure to keep appointments.
- Client could not be located.
- Client did not have transportation and was not willing to use public transport.
- Client had secured employment and could now get sufficient food supplies and buy clothing from a discount store.
- Client received food assistance from family and friends.
- Client had started receiving food stamps and no longer needed food assistance through the program.
- Client had managed to secure housing through a different program.
- Client moving out of state.
- Client is an undocumented citizen and is therefore ineligible for assistance.
- Client has secured employment and now has enough food supplies.
- Client was non-compliant with program requirements.

Table 17 provides an overview of the reasons for client discharge from the Pathways Program. It provides information on discharges for the six-month, 18-month, and 24-month evaluation periods.

Table 17: Reasons for discharge from Pathways Program

| Reason for discharge | 6 months | | 18 months | | 24 months | |
|---|------------|------------|------------|------------|------------|------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Client deceased | 1 | 0.9 | 5 | 1.6 | 8 | 1.5 |
| Client lost eligibility | 3 | 2.8 | 6 | 1.9 | 6 | 1.1 |
| Client moved/transferred elsewhere | 3 | 2.8 | 8 | 2.6 | 10 | 1.9 |
| Client completed all Pathways ²⁹ | 6 | 5.6 | 57 | 18.4 | 73 | 13.7 |
| Client requested to be removed | 11 | 10.2 | 56 | 18.1 | 111 | 20.9 |
| Client could not be located | 84 | 77.8 | 169 | 54.7 | 277 | 52.2 |
| Not impactable/Non-compliant | - | - | 4 | 1.3 | 26 | 4.9 |
| Client declined further services | - | - | - | - | 20 | 3.8 |
| Total | 108 | 100 | 309 | 100 | 531 | 100 |

While the inability to locate clients remained the largest single explanation for the failure to

²⁹ The number of completed Pathways from the client profile data set is different from the reported number of completed Pathways from the Pathways Summary dataset. The figures shown here are from the client profile data set.

complete Pathways, it is important to note that improvements in this area are evident over the course of the first two years of the Lucas County Pathways HUB Program's operation. The 52.2% of clients who were "unable to locate" after 24 months was a notable decline from the reported figure of 77.8% after the first six months and 54.7% after the first 18 months. By contrast, among those who had been discharged from the program, completing all assigned pathways and client requests to be discharged from the program became more frequently cited reasons for discharge than they had been after six months. However, while the proportion of discharged clients who had completed all of their pathways rose from 5.6% to 18.4% between December 2015 and December 2016, this figure declined to 13.7% after 24 months. Additionally, the proportion of individuals who requested removal from the program rose from 10.2% in the first six months to 20.9% after 24 months.

Comparison to Previous Evaluation Findings

- After 24 months, the major reason for failing to complete Pathways among those discharged from the program is that CHWs were unable to locate the clients after their initial interaction (52.2%). This was a decline from the reported figure of 77.8% after the first six months.
- Client requests to be discharged from the program continued to rise in relation to other reasons for discharge, from 10.2% after the first six months to 20.9% after 24 months.
- The proportion of clients discharged from the program who had completed all of their pathways increased from 5.6% to 18.4% during the first 18 months and has since decreased to 13.7% through the last 24 months.

Implications for Program Management

- While progress is being made, managers should continue to consider strategies to address the leading causes of clients not completing their Pathways, including building on progress to further reduce the frequency of discharge because of not being able to locate clients. Gaining better understandings regarding why this and other causes of Pathway completion failures occur and developing potential solutions to those problems could yield further improvements in Pathways completion rates over time.

Conclusion

In summary, analysis of the recent Pathways HUB data indicates that the Pathways Program has registered a number of successes in assisting clients to remove barriers to health care services by utilizing Community Health Workers. Accomplishments include the following:

- There has been growth in the Pathways Program as demonstrated by increase in program participation by local healthcare systems, service providers, and CHWs. Five of the seven healthcare systems in Lucas County participate in the Pathways Program, and one of the two systems that does not – the Veteran’s administration – does not have a patient population that aligns well with the target audience of Medicaid patients who are a primary audience for the program. The numbers of service providers increased from four to 12 and CHWs involved in the program have also increased from seven to 21 since the HUB Pathways Program’s inception.
- There has also been a significant increase in participants in the program as well as in Pathway assignments over the past 24 months. The number of participants has increased from 177 after the first six months to 757 participants in June 2017. The number of assigned Pathways has also increased considerably, as 3,515 Pathways had been assigned to clients as of the end of June 2017 – more than a twofold increase over the 1,396 Pathways that had been assigned by the end of the 2016 calendar year.
- There has been a broadening of the types of Pathways assigned. For example, Medical Debt Assistance, Furniture Assistance, Translation Assistance, and other Pathways were initiated after the first six months.
- There has been an increase in the number of individuals who have completed all of their assigned Pathways from 7 individuals in the first six months of the program to 64 individuals after 24 months.
- Pathways Program staff have reduced median durations (in days) for Pathway completion for a number of SSR Pathways assigned to program clients, including Food Assistance, Clothing Assistance, Legal Assistance, Transportation Assistance, and Financial Assistance.
- After 24 months, the frequency of being “unable to locate” clients after their initial interaction, the leading cause for program discharge, was reduced from about 78% during

the first six months of the program to the about 52% after 24 months.

All of these accomplishments reflect positive efforts by Pathways Program staff to better serve their clients and are likely to enable smoother and more effective functioning of their program and activities.

The evaluation results presented above also suggest areas of potential focus for future program improvement efforts. These potential areas of focus include:

- Increasing numbers of CHWs and physicians involved in the program suggest that program managers may want to assess the extent to which CHWs are working together effectively with physicians and their staffs to ensure smooth program operations and to enable quality care for Pathways Program participants.
- There are a high percentage of individuals who have partially completed or have not completed any of their identified Pathways, suggesting that added efforts might be directed toward helping individuals to complete their Pathways. According to the results of the (adjusted) multinomial regression model described in Question 7, in person encounters are significantly associated with pathway completion. The analytical results from that model suggest that an additional in person contact between the CHW and the client will result in approximately a 46% increase in the likelihood of completing all assigned Pathways (compared to completing a minority of assigned Pathways). As a result, there is reason for the Pathways Program to take steps to work toward ensuring regular in person meetings between CHWs and program clients.
- While there appears to be a marginal increase in PAM scores over time, we identified no clear and statistically significant change in PAM scores across successive administrations for clients with multiple PAM scores, nor is there any clear and unambiguous relationship between PAM scores and Pathway completion. Program Managers may want to continue collecting and monitoring PAM score information to better understand the trends associated with it and its relationship to Pathway completion.
- Some Pathways -- like Education and Housing Assistance -- demonstrate comparatively long median durations for Pathway completion. Efforts targeted toward identifying ways of reducing Pathway completion duration times in these and other areas with longer

median durations may help in improving program outcomes over time.

- Greater attention could be directed toward improving the ability of CHWs and HUB managers to keep track of clients and potential clients to reduce the number of clients who are unable to be located following their initial program enrollment. There has been significant improvement in this area over the past 24 months, as the more than three-quarters (about 77%) of the clients discharged from the program during its first six months were classified as “unable to locate” and the proportion has now been reduced to about 52% after 24 months of program operation. One possible approach to addressing this issue may be to take steps to ensure that CHWs regularly discuss approaches to ongoing communications during their monthly meetings with clients.
- While use of Pathways initiated and Pathway completion status can be good indicators to measure client progress, clinical outcomes, including diabetes and hypertension management related outcomes, might also be used to track client progress and to better understand the impact of the program on client health. Future evaluation efforts in this area may be beneficial for long term improvements in the Pathways HUB Program.

While the suggestions noted above reflect multiple areas for potential program improvement, they also reflect the kinds of issues expected as a new program is being developed and fine-tuned for continued improvement. It is hoped that the findings and suggestions contained in this report can be of assistance in this process.

Some further programmatic/process challenges that can be addressed to improve the collective understanding of Pathways Program processes, outcomes, and impacts over time are provided below.

- There has been no complete data code book for the database available to the evaluation team. This has resulted in substantial efforts and time to track down supporting information relative to learning the various data elements. Development of this kind of code book to guide future evaluation efforts would facilitate more efficient and effective program evaluation efforts and could serve as a tool for training CHWs on data entry practices.
- The data originates from multiple downloads or from multiple data sets with different data structures. The resulting time and resources used in downloading and recombining

various datasets to create integrated databases suitable for analysis has been substantial. Over time, this difficulty is likely to make future evaluation efforts more difficult, time consuming, and expensive than they need to be.

- At various points during the evaluation process, multiple duplicate Pathways were identified in the database. Resolving this issue presented a challenge to the evaluation team and Pathways HUB staff, and proved to be a labor-intensive process. While the Pathways HUB staff members have been quite helpful in eliminating duplicate entries for purposes of producing this and other reports, the duplication of entries is a matter of concern and there is need to resolve this challenge.

In spite of multiple challenges, the Pathways HUB Program has achieved multiple key accomplishments since it began operating in the summer of 2015. The program has recruited, trained, and expanded its workforce of CHWs in the community and expanded its partnership with local health systems and service providers. The number of clients entering the program has increased over the last 24 months, and the types of service areas addressed through the establishment of Pathways has increased as well. Based on the findings presented in this final evaluation report, there is evidence that program managers have identified and worked toward addressing programmatic issues. The issues where progress is apparent include reducing high loss to follow-up rates, expanding the number of Pathways, and reducing median duration times for completion of certain Pathways. These improvements, followed by future actions guided by this report to achieve further program enhancements, can improve the Pathways HUB Program's ability to achieve positive outcomes for its clients and to help ensure continued program success in the future.

Appendix 1: Sources of Referrals into the Pathways HUB

Table 18: Sources of referrals into the Pathways HUB, detailed counts as of June 2017

| Category | Source of referral | Count |
|--------------------------|---------------------------------------|-------|
| Self | Self-referral | 90 |
| School | School Referral | 3 |
| 211 Telephone referral | | 1 |
| CareNet | | 25 |
| Community Health Workers | | 116 |
| Hospital | Emergency Department | 1 |
| | HCNO-Community | 6 |
| | HCNO-Mercy | 3 |
| | HCNO Community Referrals | 44 |
| | Hospital | 2 |
| | Mercy | 16 |
| | Mercy-Gandy | 7 |
| | Mercy-St. Charles | 1 |
| | Mercy-FCC | 24 |
| | ProMedica | 3 |
| | ProMedica-CHS | 43 |
| | ProMedica-Bay Park, Midwives | 1 |
| | ProMedica-Gibbs | 1 |
| | University of Toledo Medical Center | 23 |
| Health Department | | |
| | Toledo-Lucas County Health Department | 13 |
| Health Provider | Dental Center for NWO | 1 |
| | Primary care practice | 32 |
| | Senior Independence | 44 |
| | Neighborhood Health Association | 32 |
| | Epilepsy Center of Northwest Ohio | 1 |
| Insurance Companies | Paramount | 5 |
| | CareSource | 1 |
| Other Agencies | | |
| | Community Organization | 4 |
| | Pathway | 4 |
| | Sunshine Communities | 23 |
| | Anne Grady Services | 32 |
| | Community Residential Services | 5 |
| | Bittersweet | 3 |
| | Champaign Residential Services | 1 |
| | Triad Residential Solutions | 13 |
| Other | | 95 |

Appendix 2: Providers Accepting Referrals from CHWs (Medical Home Pathway)

Table 19: Referrals originating from Community Health Workers through the Pathways HUB, detailed counts as of June 2017 for the Medical Home Pathway

| Category | Source of Referral | Count |
|---------------------------------|---|-------|
| Health Department | Toledo-Lucas County Health Department | 9 |
| Neighborhood Health Association | NHA Cordelia Martin Health Center | 7 |
| | NHA Holland Health Care | 2 |
| | NHA Navarre Park Family Health Center | 1 |
| | NHA River East Community Health | 3 |
| | NHA South Side Community Health Center | 5 |
| Mercy Affiliated Practices | Mercy Family Care Center | 1 |
| | Mercy Oregon Clinic | 1 |
| | Mercy Adult Primary Care | 2 |
| | Mercy Family Care Center – Internal Medicine | 22 |
| | Mercy Family Physicians-Jefferson | 1 |
| | Mercy Family Physicians-Navarre | 2 |
| | Mercy Family Practice – Gandy Health Center | 1 |
| | Mercy Health - Sylvania Family Medicine | 1 |
| | Mercy Internal Medicine | 1 |
| | Mercy Internal Medicine Specs | 1 |
| Toledo Clinic | The Toledo Clinic - Executive Parkway | 1 |
| | The Toledo Clinic – Laskey | 1 |
| | The Toledo Clinic – Secor | 3 |
| | The Toledo Clinic – Springvalley | 2 |
| | The Toledo Clinic – Woodley | 1 |
| | Toledo clinic | 1 |
| ProMedica Affiliated | ProMedica Physicians Adult Medicine Clinic | 5 |
| | ProMedica Bay Park Family Practice | 1 |
| | Promedica Central Physicians | 1 |
| | ProMedica Physicians Internal Medicine - Sylvania | 1 |
| | Center for Health Services | 3 |
| Independent Health Services | Darlington Nursing & Rehabilitation Center | 1 |
| | Glendale Medical East | 1 |
| | Hacker Hopple Grossman & Wenzke Medical Group | 1 |
| | Harbor Integrated Health Services | 1 |
| | Maumee Medical Partners | 1 |
| | | |
| | Sylvania Family Practice | 1 |
| University of Toledo Health | UTMC Family Physicians - Main Campus | 1 |
| | UTMC Family Physicians - Talmadge Road | 1 |
| | UTMC Glendale Medical East | 2 |
| | UTMC Internal Medicine | 1 |
| | UTMC Ruppert Health Center | 1 |

Appendix 3: Other services provided within the Social Services Referral Pathway

| Row Labels | Count of Client Id |
|---|--------------------|
| Passport services | 8 |
| Financial opportunity center | 4 |
| Furniture referral | 4 |
| Medicaid wavier | 3 |
| Smoke detector | 3 |
| Supplemental Nutrition Assistance Program (SNAP) | 3 |
| Social Security | 3 |
| Bed | 2 |
| CareNet night at DCNO | 4 |
| Clothing | 2 |
| Exercise | 2 |
| Food | 2 |
| Furniture assistance | 5 |
| Home health care | 2 |
| Hygiene products | 2 |
| Identification card | 4 |
| Lifeline phone | 2 |
| Qualified Medicare Beneficiary (QMB) | 2 |
| Referral for home health aid | 2 |
| Senior center | 2 |
| Smoke alarms/detectors | 4 |
| Toiletries | 2 |
| YMCA free membership | 2 |
| 211 | 1 |
| Air conditioner | 1 |
| Assistance with transportation and meal delivery | 1 |
| Assisted with cell phone | 2 |
| Assisting with Citizenship | 1 |
| Beds for her and her kids | 1 |
| Birth certificates | 3 |
| Briefs | 1 |
| Canceling student loans due to permanent disability | 1 |
| Cane | 1 |
| Car repair | 1 |
| Caregiver support group | 1 |
| Child care | 1 |
| Christmas | 4 |
| Cleaning | 1 |
| Clothing | 1 |
| Commode | 1 |

| | |
|--|---|
| CPAP | 1 |
| Depends | 1 |
| Disability | 2 |
| Dishes | 1 |
| Durable medical equipment | 4 |
| Emergency alert system | 1 |
| Encourage client to attend Starting Fresh Class | 1 |
| Economic Opportunity Planning Partnership (EOPA) | 1 |
| Financial budget | 1 |
| Financial counseling | 1 |
| Fitness, weigh loss | 1 |
| Food assistance | 1 |
| Food for Easter Holiday | 1 |
| Free phone | 2 |
| Free wheelchair | 1 |
| Gandy Clinic | 1 |
| Gift/food assistance | 1 |
| Government food commodities program | 1 |
| Government phone | 1 |
| Social Security Hearing | 1 |
| Holiday assistance | 1 |
| Home care assistance - light cleaning | 1 |
| Home weatherization | 1 |
| Home weatherization and food stamps | 1 |
| Hygiene items | 1 |
| Hygiene assistance | 1 |
| ID/ birth certificate | 1 |
| Identification card | 2 |
| Job and Family Services (JFS) | 1 |
| Lawn care services | 2 |
| Lead paint | 1 |
| Legal | 1 |
| Life skills building | 1 |
| Linen | 1 |
| Living Will notarized | 1 |
| Meal on wheels | 2 |
| Medicare financial assistance | 1 |
| Mercy family care center | 2 |
| Mercy family care food pantry | 2 |
| Medicare Premium Assistance Program (MPAP) | 1 |
| Need help removing items from house | 1 |
| Need walker with a seat | 1 |

| | |
|--|---|
| Needing a refrigerator | 1 |
| Obtain Social Security card | 1 |
| Ohio Senior Farmers Market Nutrition Program | 1 |
| Ohio waiver | 1 |
| Online pre -application | 1 |
| Organization to regain Divers license | 1 |
| Passport | 1 |
| Patient advocate assistance | 1 |
| Personal items | 1 |
| Pet food | 1 |
| Pharmacy delivery | 1 |
| Phone | 1 |
| Physical activity | 1 |
| Ramp needed to get in and out of home | 1 |
| Reduced price lawn care service for the disabled | 1 |
| Reduced price swimming classes for the disabled | 1 |
| Reinstate Driver's license | 1 |
| Rental assistance | 2 |
| Roof | 1 |
| Roof repair | 2 |
| RX extra help | 1 |
| School supplies | 1 |
| Scooter repair | 1 |
| Second chance Tuesday | 1 |
| Senior emergency home repair | 1 |
| Senior nutrition | 1 |
| Senior nutrition voucher program | 1 |
| Shower chair | 1 |
| Smoke detectors | 2 |
| Social Security application | 1 |
| Social Security | 1 |
| Social Security card | 1 |
| Social Security disability/(SSI) | 2 |
| Spiritual assistance | 1 |
| Supplemental Security Income hearing assistance | 1 |
| Starting fresh class | 1 |
| Starting fresh program | 1 |
| State I.D. needed | 2 |
| Stove | 1 |
| Support group | 1 |
| Thanksgiving | 1 |
| Tia chi | 2 |

| | |
|------------------------------|------------|
| Toledo Municipal Court | 1 |
| Toys for grandchildren | 1 |
| Transportation | 1 |
| Unison | 1 |
| Veteran's service assistance | 1 |
| Weatherization | 1 |
| Wig | 1 |
| Work ready express | 1 |
| YMCA | 1 |
| Total | 200 |

Note: In order to improve clarity, the raw output from the dataset was interpreted and rephrased as necessary, and where possible, by KSU and HCNO staff.