HOPE HEALTH CLINIC

Final Evaluation Report, 2011-2014

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For more information visit: www.HopeHealthKentucky.org

BAPTIST HEALTH

Executive Summary

Key Program Activities

Hope Health Clinic opened on the campus of Baptist Health Hospital (LaGrange, KY) in September 2011 as a free or low-cost provider of quality health care for low-income and uninsured residents of four rural counties in northeastern Kentucky. With an estimated 95% of Hope patients being employed, this population is respectfully termed "working poor," since the majority earn minimum wage – and often have to choose to cover living costs rather than health care. Staffed by mostly volunteer physicians, specialists and community volunteers, the clinic has a considerable network of providers that see patients through Hope referrals in their private practices, generally for a $10 fee. A center of specialty clinics at the University of Kentucky (well over 80 miles from most patients' homes) provides care primarily through a financial assistance arrangement that covers the minimum $100 fee for most Hope patients. Nursing students from the University of Louisville provide educational programs developed as part of their curricula, aimed at improving nutrition and understanding of diabetes' management, a significant health issue for this population.

Study Design, Methods, Analysis, and Measurement

The study's implementation design focused on a logic model that would lead to reduced costs for providing quality healthcare to uninsured, low-income residents, particularly patients challenged with four chronic conditions or diseases: cardiovascular conditions (high blood pressure, high cholesterol), obesity, diabetes, and smoking-related conditions. The evaluation documented the developmental stages of creating and sustaining a "clinic without walls" – a low-cost/free clinic that recruited volunteers from medical specialties and the community across four rural counties to provide services and funding. Social network analysis provided a quarterly assessment of the clinic's reach and growth among these recruited volunteer and other service providers. Qualitative and quantitative analyses were used to identify changes in health status for a random sample of patients as recorded in their paper medical records; detect changes in self-efficacy for patients managing chronic diseases; gather feedback from patients and key stakeholders; determine ongoing processes of organizational management; and document healthcare cost reductions in non-emergency use of the local hospital's Emergency Room.

Summary of Impact, Outcome, and Implementation Study Findings

As focus group participants and survey respondents confirmed consistently, patients avow that Hope Clinic has saved their lives. More than these patients' personal perceptions of impact, the local hospital's cost reductions in ER use for non-emergencies by uninsured, low-income patients were reduced dramatically. A related, unexpected outcome has been the ER physicians recruiting patients for Hope Clinic, where these patients can obtain ongoing care for their chronic conditions and diseases.

In terms of reach, Hope Clinic treated 1,916 unique patients (19.16% of the working poor in the area) across 11,125 office visits since opening in mid-September 2011. Additional care was provided via 1,244 referrals to specialists for a $10 fee or through financial assistance at the University of Kentucky School of Medicine clinics.

Analysis of health changes for the random sample of patients (N=97) may not be a fair assessment of total patient outcomes for the clinic. Mixed results indicate improvement and worsening of the four chronic conditions studied, providing evidence for key stakeholders' perceptions that patients face overwhelming, daily challenges related to low-income populations. These challenges may prevent the ability for patients to focus on ceasing smoking, losing weight, eating healthier foods, making time for frequent exercise, reducing the effects of stress, and getting adequate sleep. Hope Clinic stakeholders express determination to discover strategies to help patients better self-manage their chronic conditions, perhaps through individual wellness coaching, continued educational sessions at the clinic, and additional referrals to health departments and other service providers in the four counties served by the clinic.

I. Introduction to the Story of Hope Health Clinic

"*Helping Other People Excel . . . HOPE".*

This acronym for a community center in a small Indiana town succinctly imparts the story of our own Hope Health Clinic, a patient-centered clinic supported by the Foundation for a Healthy Kentucky and numerous local and regional organizations. More parallels exist between these two community-based efforts – both organizations provide client/patient-based centers; both inspire volunteers (from physicians and government officials to church members and business leaders) through a simple message of "somebody should be doing something;" (Dickey, 2014) and both focus on helping working-poor families who give back the blessings they receive.

> *"Someone* [another patient] *paid for my fees to visit the clinic for one year."*
>
> *—Hope Clinic Patient from Trimble County*

The primary goal of Hope Health Clinic (HHC) since its inception in September 2011 has been focused on increasing access to quality healthcare for uninsured, low-income residents in four, mostly rural Kentucky counties. This Final Evaluation Report documents evidence about the clinic's ability to provide increased access of quality healthcare for uninsured ***and underinsured*** working-poor residents, including outcomes at the individual and systems levels. Underinsured is a new category agreed upon by the Board of Directors with the advent of the Affordable Care Act and its financial burden on Hope patients.

In a largely rural region with high rates of poverty and many individuals without health insurance, quality affordable medical care had not been accessible to thousands that need it most. Approximately 10,000 individuals live in poverty in the four-county area. Inadequate services for the uninsured in the region causes local hospitals, Baptist Health LaGrange among them, excessive emergency room use for non-emergency events, particularly visits related to four preventable conditions: obesity, diabetes, smoking/chronic obstructive pulmonary disease (COPD)—largely attributable to tobacco use, and cardiovascular disease (CVD), particularly hypertension and hyperlipidemia.

Oldham County is the largest and most suburban county in the service area and ranks highest in many health status indicators and lower in terms of health risk than any other county in the

Commonwealth. This reflects the relative influence of its more affluent residents, not a lack of persons living in poverty; many large pockets of extreme poverty exists in the region, even in Oldham County. As a relatively wealthy county, it possessed the infrastructure and provided preliminary support for the development of a free/low-cost clinic to serve the needy in the county, as well as for the other poorer, more rural, adjacent counties. For neighboring Carroll, Henry and Trimble counties, these same health status measures, patient outcomes, and quality of life lag as residents forego needed medical care due to a lack of affordable health care options and an inability to access and pay for traditional health care. This project harnessed additional support from a broad four-county provider and service network to meet HHC patients' other human service needs. SIF/ KHFI/Foundation support?

Building on the academic literature to address these health issues the Oldham County Department of Health, in collaboration with Baptist Health LaGrange and the Oldham County Ministerial Association, applied to the Foundation for a Healthy Kentucky for a 2011-2014 Kentucky Healthy Futures Initiative (KHFI) grant to provide initial funding for creating the Hope Health Clinic (HHC).

Substantial research has documented health and cost benefits of providing low-cost and accessible primary care to uninsured community members (Rust, 2009; Roby et al., 2010; Ansell et. al., 2002), the benefits of elements common to the patient-centered medical home (Roby et. al., 2010; McWilliam, 2009) and the ability for volunteer providers to provide quality primary care (Dwek, 2002; Scott, Bell, Geller & Thompson, 2000). Another large body of work has highlighted the roles of lay-patient navigators, community health workers, non-clinicians and clinic volunteers to improve patient self-efficacy, patients' access to services (Mishori, 2009), and sustain high-quality care for the working poor (Barnhill, 2001; Dohan & Schrag, 2005; Schwaderer & Itano, 2007; Smedley, Stith & Nelson, 2003). Similarly, information about empowerment through self-management of chronic conditions provide a sound rationale for Hope Advocates[1] and Patient Navigator to focus on a follow-up referral system for educational strategies and programs that will assist patients in improving health outcomes through their own behaviors and attitudes (Bodenheimer, Long, Homan & Grumbach, 2002). This clinic has focused on replicating the model developed by the Church Health Center in Memphis, TN, (Hulett, 2012; Morris, 2011) which has operated successfully for 25 years, but has never been systematically evaluated for replication.

[1] Advocates are trained volunteers who focus primarily on holistic healthcare needs that are not apparent symptoms of acute medical conditions, e.g., clothing, food pantries, spiritual, nutrition and exercise classes.

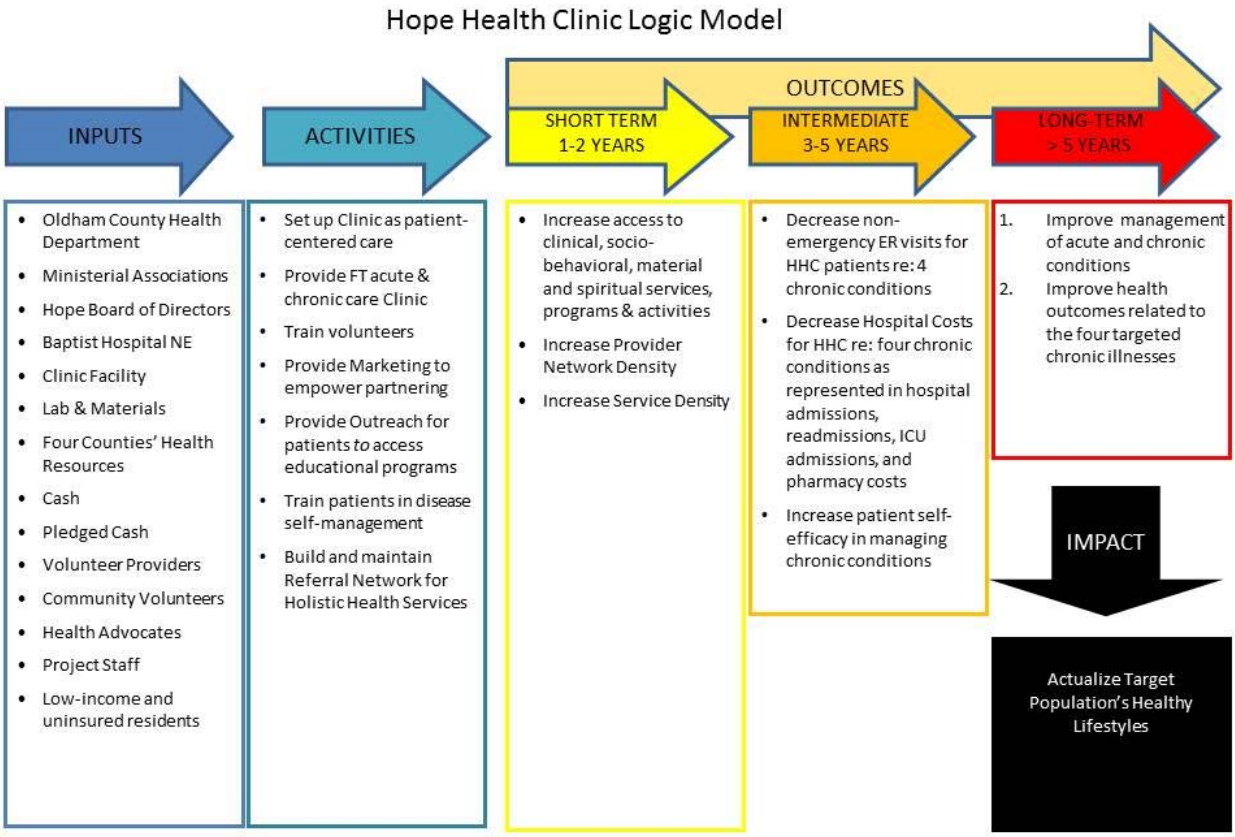
This KHFI grant provided the resources needed to initially establish a full-time, low-cost health clinic to provide patient-centered primary and acute care to regional residents in need. The clinic's embedded patient navigation system offers clients, families, and caregivers assistance to help overcome healthcare system barriers and facilitate timely access to quality specialty medical and other needed human and social services (e.g., health education classes, behavioral health services, nutrition services especially for patients with diabetes).

By implementing these activities, we made substantial progress on the following outcomes over our three-year project:

- Increased healthcare access for low-income, uninsured, and underinsured residents with acute and chronic conditions;
- Increased use of holistic care services (mental health, stress management, nutrition and exercise classes, etc.) associated with acute disease and chronic conditions for low-income, uninsured, and underinsured residents;
- Decreased healthcare costs associated with treating chronic conditions for low-income, uninsured, and underinsured residents and safety-net providers through use of Hope Clinic; and
- Population-wide improvements in morbidity and mortality.

A visual representation of the program is presented in the logic model developed to describe the HHC and associated outcomes, figure 1, below. Where data were available, this report documents progress toward these outcomes during the past three years.

Figure 1: Program Logic Model



II. Evaluation Questions and Goals

The purpose of this evaluation was to provide preliminary evidence of program impact by documenting program outputs and outcomes, and reporting these results to program staff and funders about the implementation of this rural clinic. The first-year evaluation documented successful implementation and provided preliminary evidence of improved clinical outcomes among patients, and focused on the role of a service network to support these objectives and clinic operations. This final evaluation report documents ongoing progress and current outcomes, as the clinic continues its growth in network outreach among providers in the four-county area and in other parts of the states.

Evaluation questions included:

1. To what extent did the implementation of the Hope Health Clinic adhere to its planned implementation process?
    a. How many staff members were hired? (Goal of 3)
    b. How many volunteer providers were secured at start up? (Goal of 3)
    c. How many hours per week was an acute and chronic care clinic set up? (Goal is full time)
    d. How many new volunteer providers were secured? (Goal is 3/month)
    e. How many new volunteers and health advocates were trained per month? (Goal of all)
    f. How many new network members did the marketing function secure each month? (Goal is one new per month)
    g. How many educational programs/month were patients engaging in? (Goal is 1/month)
    h. How many patients (n/%) received disease self-management training where it was indicated? (Goal is 5/month)
    i. How many patients per month completed referrals? (Goal is 3/month)
2. To what extent was the holistic-based Hope Health Clinic, using a patient-centered hub for acute and chronic care with a navigation system (Clinic Without Walls) successful in improving health outcomes and reducing healthcare costs associated with low-income and uninsured residents in its four-county service area?
    a. To what extent did Hope Health Clinic increase access to clinical, social-behavioral, material and spiritual services, programs and activities for low-income and uninsured residents?
    b. What variations in access exist for people from different counties of residence? (Is service access equitable for all patients in the service region?)
    c. What variations in access exist for people with different chronic diseases or health statuses?
    d. To what extent did provider density expand during year 1? (Are more medical and social services providers available as part of the clinic without walls network over time?)
    e. To what extent does the location (county of residence) play a role in increasing provider density?
    f. To what extent does the chronic condition of the patient play a role in increasing provider density?

g. To what extent did service density expand during year 1? (To what extent and with what frequency are HHC patients engaging in referred medical and social services?) Is this related to medical condition, poverty status or county of residence?
h. What is the effect of a patient's level of poverty (SES) on service density?
i. What is the effect of a patient's county of residence on service density?

Several additional questions, about the social network analysis, were added to complement and better answer the evaluation questions listed above:

3. What does a social network analysis tell us about the operations of the clinic without walls network?
   a. How does a medical service network expand from an initial baseline state?
   b. How do patients with different needs and characteristics flow through a medical service network?
   c. How do different subgroups (e.g., cancer versus diabetic patients) flow through the network, and how can network density help providers understand the network?

III. Methods

The evaluation used mixed methods and a network analysis to provide information at the clinic and system levels, which complemented the detailed data obtained at the individual level through medical records for a randomly selected sample. Our research study design intended to provide preliminary levels of evidence as outlined in the guidance provided on behalf of the Corporation for National and Community Service's Social Innovation Fund.

A. Data Collection

The data collection efforts focused on answering the questions posed above regarding: program implementation, patient reach and demographics, access to primary and referral resources, observable health improvements, service utilization, and the development and status of a "clinic-without-walls" network.

Following the implementation evaluation design in our evaluation plan, we focused on individual (outputs, self-efficacy) and system (outputs, ER and admissions) levels to examine preliminary outcomes. Data sources included patients' paper medical records, self-efficacy forms (see Appendix E) completed by patients, three focus groups with 23 patients (compliant, non-compliant, and Spanish-speaking), quarterly program reports, hospital admission and ER records, referral logs, clinic records,

observations, and interviews and a focus group with key staff and stakeholders. We used these to generate descriptive statistics for patient demographics, clinical diagnoses, health outcomes, social services engagement, knowledge, and attitude levels. The Social Network Analysis (SNA) (discussed more below) examined referral documents and included a focus group with key stakeholders.

B. Description of Social Network Analysis Methodology

An important part of this initial work is the social network analysis (SNA) we conducted to determine the breadth and depth of outreach HHC is able to achieve. SNA was used to gain a better understanding of the healthcare provider network and its resource exchanges, as the analytical technique was used to explore the clinic and its network members in more detail. Data were collected from the patient navigator's patient referral logs, which provide information about the health services providers used and services obtained.

SNA employs qualitative and quantitative approaches to understand the collective network, its members, and their relationships. This analysis includes the creation of sociograms, or visual depictions of the networks with their members and relationships. Within a sociogram, a single point (a node) represents a network member, and a line drawn between two nodes indicates a relationship between two members. Sociograms display the complete collection of nodes and relationships within the network. Researchers also can create a series of sociograms for different time periods, and these diagrams provide insights into the network's evolution, such as when members joined the network and how they interacted over time (de Nooy, Mryar, & Batageli, 2005).

Analysis included three steps: 1) classifying network members into two categories (e.g., healthcare providers, clients); 2) creating sociograms to display the social network, its members and their relationships; and 3) using qualitative and quantitative analysis to describe the network. Sociograms were used to display network members and their individual relationships, and provided insight into the network's structure with its members and their levels of connection to one another. The sociograms were constructed at various points in time (i.e., across eleven quarters from 2012 to 2014) to explore the development and evolution of the networks over time (de Nooy, Mrvar, & Batagelj, 2005).

For HHC, the purpose of SNA is to evaluate whether the holistic-based HHC—using a patient-centered home model and navigation system—improved health outcomes and reduced healthcare costs for low-income, uninsured residents in its four-county service area.

The process used SNA to measure the development of and outcomes associated with HHC healthcare delivery. HHC, with its collection of healthcare delivery providers, clinic staff, volunteers, and patients, represents a social network, and SNA is being used to examine the network in multiple ways, identifying: 1) which members existed within the network, 2) what relationships connected members together, 3) what resources were exchanged through these relationships, and 4) how the resource exchanges evolved over time.

C. Data Analysis

Quantitative data were analyzed using SPSS and Excel to conduct measures of variability (frequency counts, cross-tabulations, and statistical difference in proportions test) and central tendency (means). Excel spreadsheets were maintained to house these data collected from patient medical records, referral logs, self-efficacy forms, and quarterly reach reports. For each quarterly report since October 2012, self-efficacy frequencies and means were conducted in Excel for unique patient visits and for repeated visits. Referrals for this entire reporting period were cross-tabbed in SPSS to discover patterns across counties, quarters and providers. Frequency distributions were run to identify proportion of patients by their county of residence being referred to specialists. A follow-up crosstab explored completed referrals versus no-show or reschedule by county of residence. For the random sample of 102 patients, the statistical difference in proportions test was conducted for Oldham County patients, which is the one county with a sample distribution adequate for this analysis.

Qualitative data were analyzed without software, using general theme-search techniques, due to the limited amount of these data collected. A qualitative comparative analysis (QCA) had been planned for the self-efficacy (SE) data linked to referrals, but insufficient data prevented a meaningful QCA process, specifically because an insufficient number of referrals were related to the four conditions followed in the evaluation, and because the variability in the administration of the SE questionnaires unfortunately called into question the reliability and validity of the reported scores.

Gephi software was used to analyze the network and referral data; this analysis can explore a network's diffusion process with the spread of services and other innovations; details are provided in the Social Network Analysis section, beginning on page 35.

D. Limitations

This design targeted a preliminary level of evidence for this project because we did not have a viable comparison group with which to compare changes that take place with the development of this new, unique clinic. We do not have the resources at this point to develop a sufficiently large sample with repeated data points to claim a higher level of evidence. Our analysis is further complicated by substantial conditionality attributable to variations in poverty status, medical condition type, and county of residence. The main strategy for the evaluation has been to remain focused on the implementation questions for the clinic's first three years (coincides with funded project timeline) and document the effect on inappropriate emergency room use by low-income residents (which include an unexpected outcome repeatedly occurring during the first three years of Hope Clinic – ER physicians refer qualifying patients to Hope for long-term care of chronic conditions).

Required Changes to Original Evaluation Plan

Due to a significant barrier, we do not attempt to answer all the implementation questions, specifically because an electronic medical records system is needed to gather and analyze the data required. Despite this barrier, the clinic is using a no-cost EMR system for recording general demographics and appointments for patients. The primary reason for delay in obtaining a system-wide EMR is the reality that volunteer medical providers already have a variety of EMR systems at their individual practices. Clinic decision makers do not want to burden these already-generous volunteers with an additional task. A full EMR intended for a Fall 2013 implementation was not realized due to an inability to obtain the needed hardware in each examination room. As funds are obtained, however, convertible tablets (able to function as a tablet or a laptop) are being provided for physicians and specialists willing to learn a new system; for others, a medical-educated volunteer will record physician's notes into the EMR. In the meantime, the Clinic Administrator developed a continuous, near-daily process for collecting useful patients' visits data for producing reports-on-demand, a needed resource to provide potential funders, volunteer medical professionals, and community stakeholders.

Due to logistical constraints for clinic staff, the method for measuring short-term outcomes for referral strategies used by volunteers was changed from a single focus group to 20 clinic site visits to examine and analyze patients' medical records, make direct observations, and conduct a focus group with the clinic administrator and three other key stakeholders (project director who is now chair of the new non-profit; fiscal agent for the FHK grant who is director of the local health department; and the medical director for HHC).

Due to limited transportation opportunities and patients' employment constraints (Clinic Administrator estimates that 95% or more of HHC patients are part- or full-time employed), focus groups with patients were not feasible until gift cards for gas or groceries were provided, and the clinic administrator willing to keep evening hours to accommodate patients' work schedules. To obtain additional patient feedback and input for improvement suggestions, the Patient Survey (see Appendix D) was mailed in May 2013. The low response rate (8%) was augmented by phone calls and three focus groups with patients

Self-efficacy has continued to present a challenge. The clinic consistently collected the brief self-efficacy forms (six items in English, four items in Spanish—on separate forms) prior to each patient's visit beginning in October 2012. By January 2013, however, clerical volunteers tapered off in asking each patient to complete the forms; we are unsure why this deviation happened, but suspect two causes: patient complaints about its redundancy (for repeated visits) and new volunteers forgetting to include it with the host of forms that new patients have to complete.

III. Results

During these initial years of clinic operations, the evaluation proposed to examine several short-term exploratory outcomes of implementation activities. Results from the clinic's three years are discussed regarding: 1) organizational change; 2) program reach; 3) program implementation activities; 4) the clinical experience and outcomes among a 102-patient sample; and 5) a qualitative and quantitative report on the social network analysis regarding referral patterns detected to date.

Organizational Change

The Oldham County Ministerial Association (OCMA) often and consistently demonstrated its commitment to the clinic. OCMA obtained its 501(c)(3) non-profit status specifically to develop and operate the Hope Health Clinic. It created the dynamic vision and mission for HHC, updating them through consensus as need is suggested by Board members. OCMA recruits most of the faith-based volunteers to ensure the ongoing operation of the clinic. Its Board of Directors hosted a two-day retreat in September 2012 to reorganize itself to better meet the clinic's growing, complex needs. Changing from a one-unit group to three Councils, Board members now are grouped to focus on specific functions required for sustaining HHC outreach and outcomes: Operations, Resources, and Advocacy. The reorganization was assisted in no small part by the current HHC administrator, who brought 20 years of

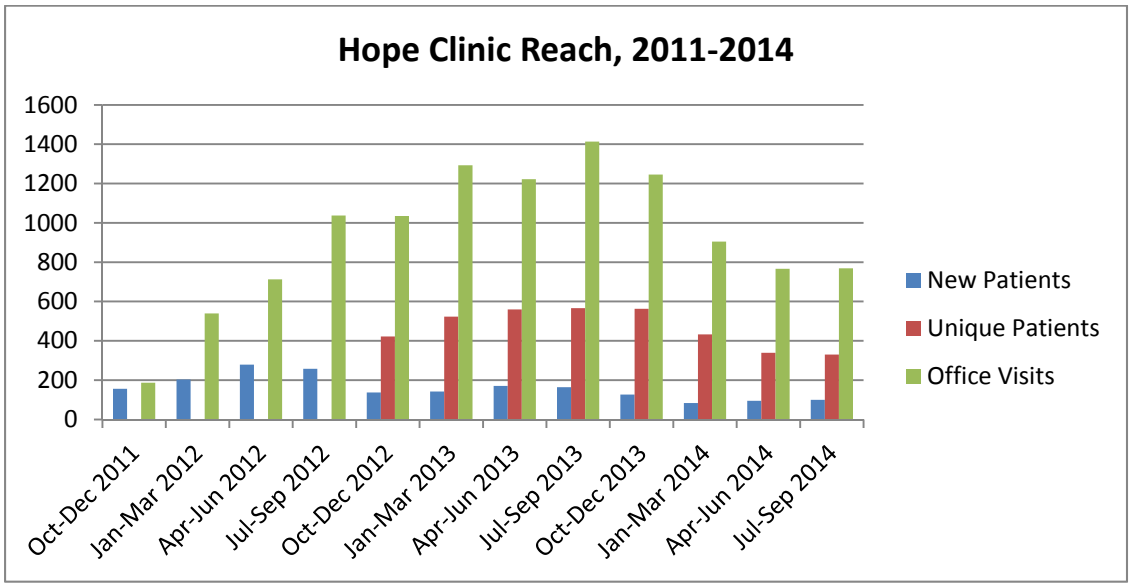
experience with a church and four years' volunteer experience with a rural clinic when hired in April 2012. A unique mix of faith ministers, medical providers, clinic staff, volunteers, and researchers continue the clinic's intention to sustain broad representation of support in the community. (The SNA results below provide details about the variety of HHC supporters.) These changes allow individual OMCA board members to focus their strengths on specific elements of clinic work where their passion and skills are most concentrated.

A more significant organizational change occurred in Year 3: HHC has formed its own 501(c)(3). Perceptions among churches in three other counties were reported by clinic volunteers, indicating that Oldham County ministries were seeking volunteers only from its members. As word spread about the new non-profit, an increase in both donations and volunteers has occurred from non-Oldham County churches and communities. This particular growth has been aided in some part by the continuity of the recently retired vice-president of the local hospital, who chairs the new organization. Her influence among the region's volunteer groups and funding sources is showing early signs of success.

Program Reach and Demographics

The data indicate that Hope Health Clinic increased access to clinical visits, diabetic and other educational programs, and healthy eating activities for low-income and uninsured residents in the service region. While the previous clinic provided very limited service access (2-4hours/week) and was able to provide care for 719 patients over its five years of operation, Hope Clinic established full-time clinic hours (40+ hours/week), and treated 1,916 unique patients—19.16% of the working-poor population in the four-county service area—in 11,125 office visits since opening in 2011. Figure 2 illustrates HHC's reach across the clinic's first three years of service.

Figure 2: Hope Clinic Reach –October 2011-September 2014



As the chart above illustrates, the clinic attracted a growing pool of new patients up to the quarter ending September 2013 (between 137 and 279 per quarter, peaking during April-June 2012, with an average of 189 new patients per quarter). One indicator that the clinic is meeting and serving the pent-up demand for services, the average number of new patients in Year 1 was 224 per quarter. In Year 2, this number dropped by one third to 154 per/quarter, a number believed to be sustainable. Beginning in the last quarter of 2012, in addition to tracking new patients discovering and visiting the clinic (a proxy for improved access and successful outreach/marketing), we began to track the totals of new and returning patients ("unique patients") by quarter. Just as new patient numbers stabilized and dropped, the census showed an increase in unique patients over time from 422 in Q4 2012, to 523 in Q1 2013, 560 in Q3, and also peaking in Q4 2013 at 566. The trend for increasing office visits escalated very aggressively up to September 2013, peaking at 1,413 office visits, which is unsustainable, but leveled off and began to decline to 769 visits by Q4 2014. As word of mouth spread, the clinic saw an increase in patients from the most distant county (Carroll, from 5% in Year 1 to 11% in Year 3), but distance remains a barrier that will limit this trend. Oldham County saw a decrease in percentage of patients, from 62% in Year 1 to 54% in Year 2 and 56% in Year 3. Trimble County's percentage also decreased over time, from 13 % in Year 1, to 11% in Year 2 and 10% in Year 3. Henry County, closest of the three rural counties to the physical location of the clinic in Oldham, peaked in Year 2 at 23% of patients, with a 19% proportion in both Years 1 and 3.

Hope patients come from throughout the four-county region—Oldham, Trimble, Carroll and Henry—targeted by the clinic, with the largest numbers coming from the host county, Oldham (see figure 3), and patients coming in numbers related to the relative distance from the clinic, once again reaffirming the concept of distance as a barrier the working poor face in accessing health care services.

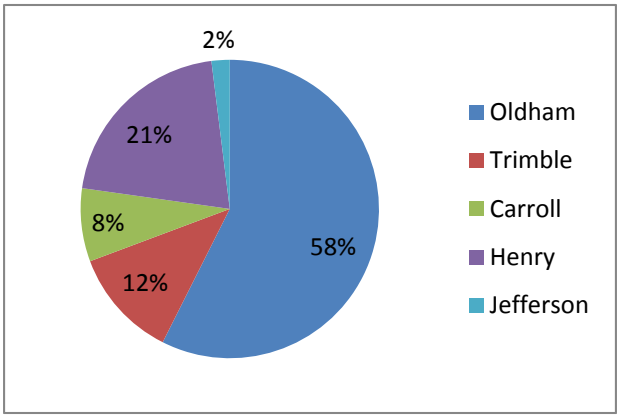
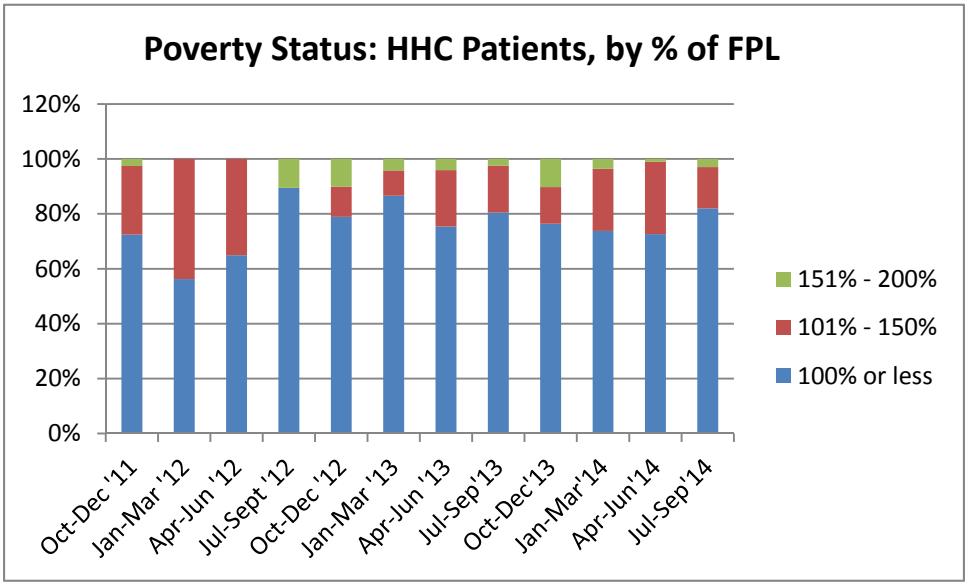


Figure 3: Distribution of Hope Patients by County of Residence

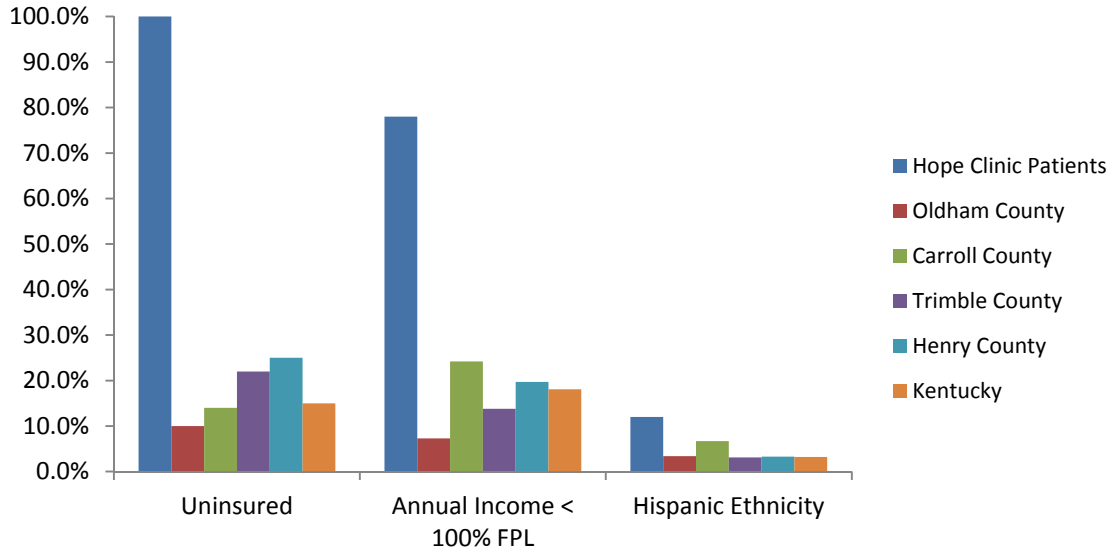
The population accessing services is among the poorest in the counties. The clinic continues to serve uninsured and underinsured patients, but to assure we were providing clinic access to our intended —the most needy —patient population, we began collecting annual household income on the patient intake form. Figure 4 provides results over the three-year project, indicating that 72% of patients providing these data reported income at 100% or less than the Federal Poverty Level (FPL) during the first half of this project, with that level increasing to 78% over the last 18 months; these rates exceed the average poverty rates in the four-county service region by at least three, and as many as ten times. By contrast, only 1% of Hope's patients claim an income greater than 200% of FPL. Figures 4 illustrates the distribution, by quarter and cumulatively, of new HHC patients by income as a percentage of FPL.

Figure 4: Poverty Among Hope Patients



To summarize other demographics, slight changes in patients' descriptions remained relatively stable over the three years of the project, with 64% females and 36% males, 99% between the ages of 19-64, and 15% identifying themselves as Hispanic ethnicity. Regionally, Hispanics constitute only 3% of the total population. The clinic population, in terms of traditional U.S. markers of poor health care access (lack of insurance, low income and Hispanic ethnicity) compared to county means is depicted in Figure 5. Comprehensive demographics for HHC patients by quarter are provided in Appendix A.

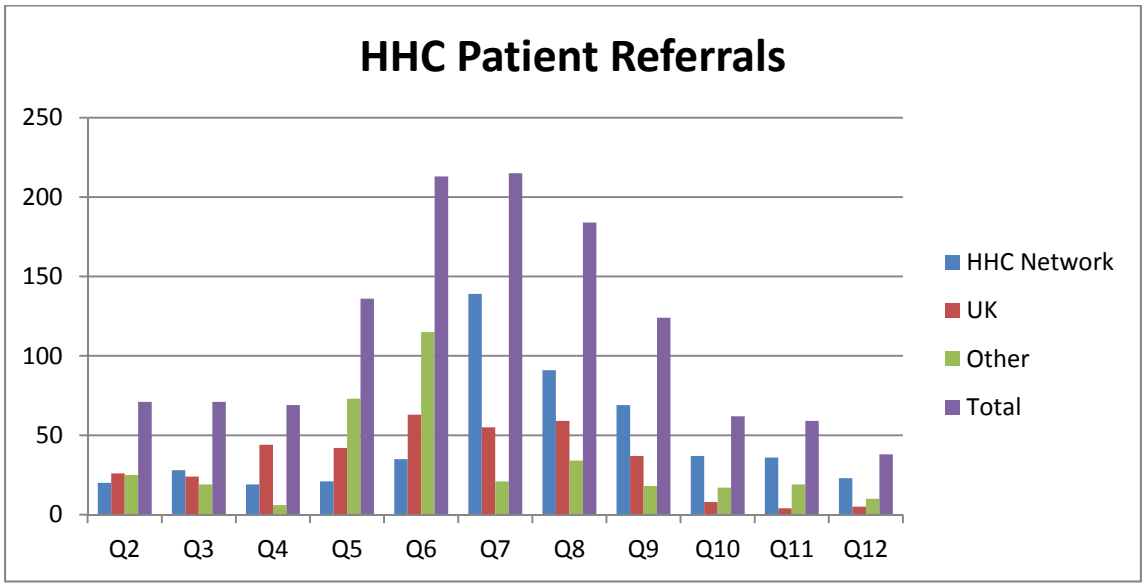
Figure 5: Access and Disparities: Hope Clinic and Comparisons



In addition to access to Hope Clinic's services, referrals extend access beyond the acute care and chronic disease management it provides to include medical specialty care at the University of Kentucky clinics and at specialists' offices located on Baptist Health LaGrange's campus (adjacent to the clinic). Between October 2011 and September 2014, patients received 1,244 referrals for outside care. Figure 6 provides referral volume of the clinic over its three-year period, and includes the two most prevalent referral targets (University of Kentucky Specialty Clinics and Hope Health Care Network Specialists). "Other" refers to all other referrals made: the health departments in each of the four counties, dentists, counseling, University of Louisville neurology, Norton oncology, and the Lyons Eye Institute. Details about the referral options are presented later in this report among the results of the social network analysis, found in the appendix. As the network and relationships with referral resources developed, referrals increased. Quarterly referral volume increased threefold from the early months of clinic operations when the clinic averaged about 70 per quarter, to the 213 in the quarter January-March 2013. Referrals peaked in the next quarter, April-June 2013. During the following quarter, patients began to express concerns and fears about the coming rollout of the Affordable Care Act (ACA) and its effects on their ability to continue as a Hope patient. These concerns and fears manifested in decreases in patient visits and related referrals across quarters during the last 18 months. More about the impact of ACA impact follows in the Discussion section.

Most of the referrals (84%) don't appear to be related to the four conditions being followed by this study, but HHC determinedly meets the acute needs of patients by providing needed access to primary and specialty care.

Figure 6: Hope Clinic Patient Referrals, 2011 - 2014



Though referrals to the specialty clinics at the University of Kentucky's School of Medicine (UKSOM) during the early months constituted the majority, at just over one-third of the total referrals, the network of other specialists grew rapidly and engaged more frequently with Hope patients (nearly 90% located in Oldham County), peaking at 65% of 215 referrals in Quarter 7 (April-June 2013). By the final quarter of the three-year project, total referrals decreased to 38 of which 61% were the network specialists. Transportation for the 150-mile trip to UKSOM has been a considerable factor for most patients, as are the qualifying financial forms to cover the $100 fee and the increased availability of local specialists to meet acute and chronic needs of Hope patients.

Qualitative data collected from staff interviews and evaluator's observations originally revealed that although the clinic administrator developed clear clinical protocols to govern making and monitoring compliance of patient referrals, these data are not consistently available. The nurse calls and makes the referral appointments for the patients, and then enters them into the clinic log so clinic and volunteer staff can make reminder calls to patients of their referral appointments and, ideally, confirm it was completed. However, confirmation of completed referral is not recorded to date, due to lack of time to make the calls. The logs do have notations for a no-show or when a patient has to be rescheduled, providing our rationale that no notation assumes a completed referral has occurred. Because acute care is still the priority for most patients, meeting their immediate medical needs has been the focus for 85.2% of referrals. However, the Board passed a proposal from the Operations Council at its Fall Retreat

2013 that addressed follow-up on all referrals. Since that decision, volunteers assist the nurse on a near-daily basis in making follow-up calls to ensure patients are reminded of referrals.

The evaluation also proposed to illustrate variations in access for people from different counties of residence (i.e., is service access equitable for all patients in the service region?) and variations in access for people with different chronic diseases or health status. The evaluation does not yet have sufficient data to assess this variation. However, our qualitative analysis from interviews with the Clinic Administrator and two primary volunteers cite transportation as a persistent problem that affects service access for the remote counties, a factor for providing healthcare equitably across the service region. Because of this issue, clinic leaders continue to consider seeking funding for an expansion satellite office in either Trimble or Carroll County.

Implementation Fidelity

Implementation fidelity to the anticipated process for serving patients has been achieved for the first two sections (Section A & Section 2) of the detailed flow chart presented in figure 7.

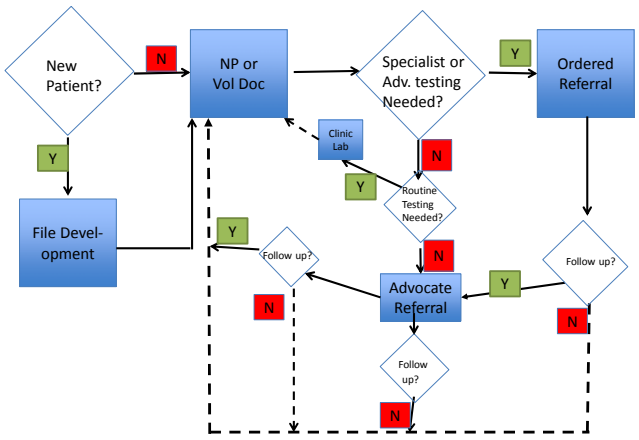
Section 3 has been implemented with a minor change. The "Advocate Referral" primarily is carried out by the nurse/patient navigator, rather than the trained group of Health Advocates. Originally anticipated to be a highly interactive group with the patients, the Health Advocates had minimal face-to-face contact with the patients, making phone calls instead to assess needs.

ons.

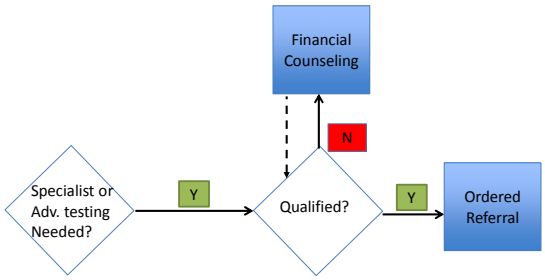
For this patient population, a stranger's voice on the phone was not trusted, representing an inconsistency with the hands-on respectful treatment patients receive at the clinic. Frustration with the advocates by the patients led to a reassessment of how this important service could be provided. At a Fall 2013 Operations Council meeting, a proposal was developed to launch a Patient Advocacy Project with advocates who will serve in a various capacities. Although the Board approved the multiple strategies proposed, volunteer staff needed for implementation has been difficult to develop to date. However, qualitative analysis on the face of the proposal indicates that significant fidelity with Section 3 will be accomplished, if volunteer staffing can be recruited.

In the next section, table 1 provides details for answers to the implementation fidelity evaluation sub-questions regarding program outputs over the three years of the study.

Section A. Flow Chart Overview



Section 2. Detail for Patient Qualification



Section 3. Detail for Advocacy Referral Process

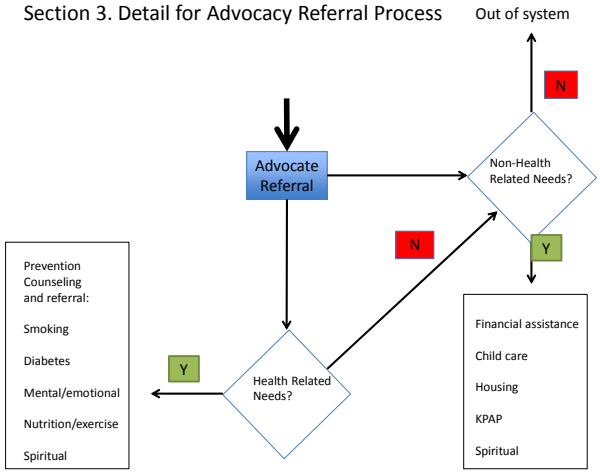


Table 1: Implementation Fidelity: Evaluation Outputs Sub-questions, October 2011–September 2014.

Implementation Question	Goals	Actual for Three Years	Goal reached	Notes
a. Number of staff hired	3	4	Yes	4 staff use 2.5 FTE. See discussion
b. Number of volunteer providers secured at start up	3	6	Yes	4 providers continue to support Hope clinic, who also volunteered at the previous clinic; 2 additional providers serve weekly at the clinic
c. Number of hours per week clinic serves patients	40	42.5 on average	Yes	38 hours clinic plus 4.5 hours mental health counseling, unanticipated at the inception of the clinic
d. Number of new volunteer providers secured per Qtr in Y1	3/Qtr in Y1	28+	Yes	12 new providers by end of year 1 deemed necessary for clinic operations; 28+ doesn't include UKSOM specialty clinic providers
e. Number of new volunteers and health advocates trained per month	100%	100%	Yes	All volunteers are trained within a month of volunteering
f. Number of new network members secured by marketing function each month	20	80	Yes	Increase from 52 members during first 18 months, a 54% increase during the final 18 months.
g. Number of educational programs engaging patients	1/mo by end of Y1 (total goal 12)	33	Yes	During first 18 months, 10 educational programs by nursing students engaged 25-30 patients per session at HHC, plus 23 patients engaged in smoking cessation; for last 18 months, see discussion.
h. Number of patients who received disease self-management training where it was indicated	5/mo	25x10 =250 (not unique patients)	Yes	Educational programs are related to self-management of the four conditions we are following; an EMR would identify "where it was indicated" with precision
i. Number of patients who completed referrals	99 (3/mo x 33 mos)	1,242	Yes	Referral log indicates 1,244 referrals made from 1/12-9/14 (33 months)

Clinical Experience & Outcomes of the Patient Sample

The program logic model presented earlier includes short-term implementation outcomes, and future patient outcomes we are beginning to track. Ultimately, the project proposed to improve the

health of those living with chronic illness through a holistic delivery of services to Hope patients. To assess patient outcomes, the evaluation team created a sample of patients with at least one of the four chronic diseases listed. The evaluators hoped that by selecting a population whose disease(s) require regular clinical monitoring, the sample would provide the opportunity to follow these patients over time. Although this sample lacked a comparison group, we hoped to see changes within the population that suggests an effect of the clinic to improve health status and change health behaviors, including disease self-management.

The evaluation team drew a random sample of 102 clinic patients from a sub-population of clinic patients with one or more diagnoses of the conditions of interest (CVD, obesity, tobacco use disorder [smoking] and Type II diabetes). Of the original 102 selected, 98 active patients remained during the first 18 months of the clinic. During the last 18 months, we confirmed that three patients obtained insurance and are required to obtain care elsewhere, one patient was dismissed from the clinic, and five patient files could not be located for data follow up or no evidence of study criteria could be found in the file (though patient qualified during the October 2012 random draw). We kept the 102 in the sample as a way of obtaining additional patient perspectives into Hope's effectiveness, either through phone calls, mailed surveys, or focus groups. In the random drawing process, we replaced 18 cases to replace ineligible patients who did not meet the selection criterion.

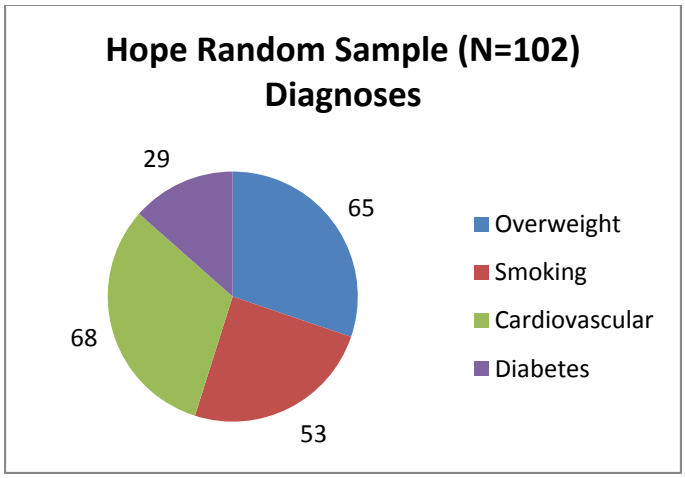
While the sample size for some counties in the sample distribution are too small to employ a statistical difference in proportions test, the distribution across Oldham County is not significantly different in proportion to total of Oldham County patients seen in the clinic at a 95% confidence level (58.8% in both cases). Gender proportion differences between the two groups are not statistically significant at a 95% confidence level. This is not unexpected; both categories were apportioned deliberately to resemble the patient population.

Table 2: Distributions between Patient Sample and Total Patient Population at the time of Random Draw in October 2012

Gender	Sample (n=102)	Population (N=1336)
Male	42.6%	34.1%
Female	57.4%	65.2%
Missing	0.0%	0.7%
County of Residence		
Oldham	58.8%	58.8%
Carroll	9.8%	6.7%
Trimble	11.8%	12.4%
Henry	17.6%	20.9%
Other	0.0%	1.3%

Medical records for this group in October 2012 indicate that 41 patients were diagnosed with only one of the four conditions (see breakdown for distribution across cardiovascular disease [CVD], obesity, smoking [tobacco use disorder], and Type 2 Diabetes [DM]). The remaining 61 patients' records indicate co-morbidity with at least one of the other three conditions. More patients have multiple morbidities than those patients that have only one. Figure 8 provides diagnoses in September 2014; tables 3 and 4 provide an in-depth look at co-morbidities for each of the four conditions.

Figure 8. Random Sample of Patients by Diagnoses of Four Conditions, October 2012



Results from the survey of May 2013 to better understand how patients manage co-morbidities achieved a very low response rate (N=9, 8.8%). Follow-up phone interviews (N=10; details in later discussion) were conducted using the same items (see Patient Survey in Appendix C). Data from the sample in table 3 give an illuminating snapshot of the disease burden of this study group; table 4 provides an updated view of these same patients, with an increase in co-morbidities that highlights the difficulty patients have in managing chronic conditions while dealing with overwhelming daily life issues.

Table 3: Chronic Disease (CD) Burden (four types) among the Patient Sample by Morbidity, October 2012.

	Diabetes	Obesity	Smoke	CVD	ALL
CVD only				20	20
CVD + Obese		18		18	18
CVD + Obese + Smoke		12	12	12	12
Smoke only			11		11
CVD + Obese + DM	11	11		11	11
Obese only		8			8
CVD + Smoke			7	7	7

Obese + Smoke		5	5		5
DM only	2				2
CVD + DM	2			2	2
DM + Smoke			2		2
CVD + Smoke + Obese + DM	2	2	2	2	2
DM + Obese	1	1			1
CVD + DM + Smoke	1		1	1	1
Total	**19**	**57**	**40**	**73**	**102**
Total 1 CD	**2**	**8**	**11**	**20**	**41**
Total >1 CD	**17**	**49**	**29**	**53**	**61**
% comorbidity among patients with each diagnosis	**89%**	**86%**	**73%**	**73%**	**NA**

Table 4. Chronic Disease (CD) Burden (four types) among the Patient Sample by Morbidity, September 2014.

	Diabetes	Obesity	Smoke	CVD	ALL
CVD only				6	6
CVD + Obese		17		17	17
CVD + Obese + Smoke		12	12	12	12
Smoke only			8		8
CVD + Obese + DM	16	16		16	16
Obese		6			6
CVD + Smoke			10	10	10
Obese + Smoke		3	3		3
DM	1				1
CVD + DM	2			2	2
DM + Smoke			0		0
CVD + Smoke + Obese + DM	12	12	12	12	12
DM + Obese	0	0			0
CVD + DM + Smoke	1		1	1	1
Obese + Smoke + DM	2	2	2		2
Total	**34**	**68**	**48**	**76**	**96**
Total 1 CD	**1**	**6**	**8**	**6**	**21**
Total >1 CD	**33**	**62**	**40**	**73**	**75**
% comorbidity among patients with each diagnosis	**97%**	**91%**	**83%**	**96%**	**NA**

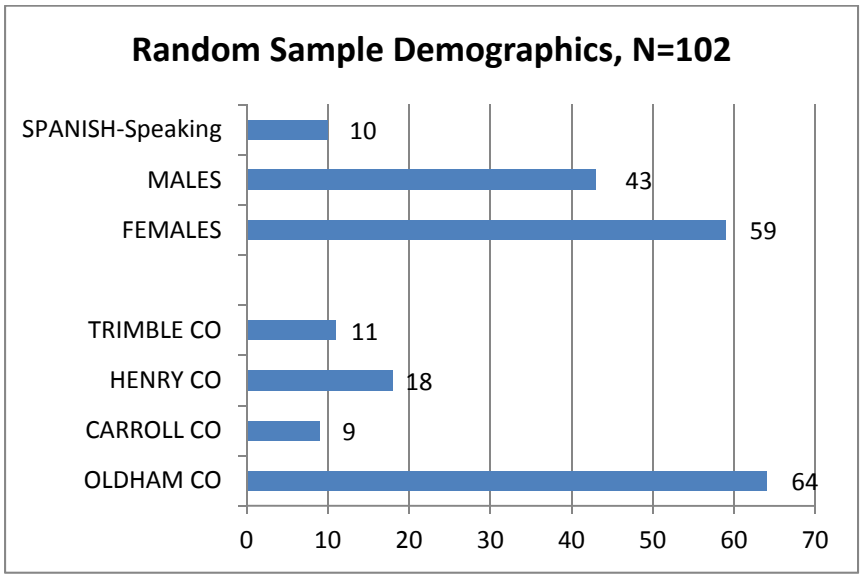
The most prevalent disease among this group of four for the sample continues to be cardiovascular disease, primarily hypertension and hyperlipidemia. In October 2012, nearly three-fourths of the sample had a diagnosis of CVD (73/102), and among those, 53 cases co-occurred with at least one of the

comorbidities we are tracking. By September 2014, 78.4% of the remaining sample (76/97) were diagnosed with CVD. (Sample decreased by five patients whose files could not be found or data were inadequate for inclusion.) However, while only one patient in the sample had a simple diagnosis of diabetes, diabetes almost always co-occurred with other diseases; the remaining patients with diabetes had at least one on the other condition. In a majority of the diabetes cases, it co-occurred with both CVD and obesity together (16/34, 47%). Obesity co-occurred with other diseases 91% of the time, and tobacco use and CVD both co-occurred with other diseases in this sample. These data underscore the complexity of managing this highly co-morbid and multiply diagnosed population.

It is important to note that this was a sample of persons with at least one of the four conditions of interest. It is not a random sample of the clinic population and likely may not reflect the chronic disease burden of the total clinic population, though providers and the clinic administrator anecdotally suggest that these four conditions are prevalent in most patients. Given the resources available and the medical record system employed by the clinic, a thorough assessment of disease burden in the patient population is not possible at this time. If the clinic implements an electronic medical record, future evaluation efforts will be able to assess disease burden in the patient population and make such a comparison.

Patient demographics for the random sample are presented in figure 9. Five patients (two men and two women from Oldham County, one man from Carroll County) were excluded in analyses because their files or data were unable to be found after October 2012); or only a payment was found in the previous clinic's file for one patient, though payment was made on 9-27-11 (during early start-up of clinic, many well-meaning volunteers had not been trained yet and may account for this loss).

Figure 9. Random Sample Demographics



Patient visits varied among the random group; see figure 10. Because 16.5% (16 of 97) of these patients had only one visit recorded in their medical files, we were unable to make any determination of change. Table 5 displays patient visits in the random group by gender and county. Four patients made no visits that were recorded in their files. Though women represent 59% of the random group, they made 65% (522/799) of the visits.

Figure 10. Patient Visits for Random Sample, September 2011-September 2014

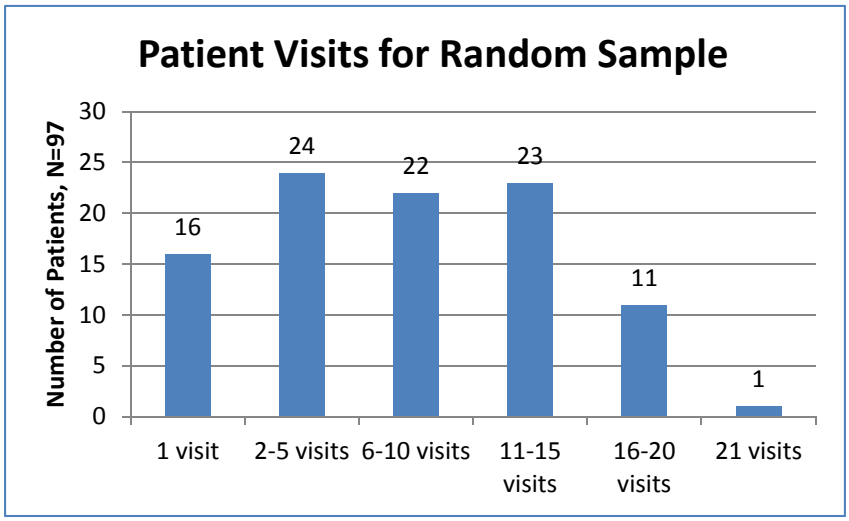


Table 5. Random Sample Patient Visits by Gender and County

Gender	Carroll	Henry	Oldham	Trimble	Totals
Female	46	46	367	63	522
Male	16	52	169	40	277
Totals	**62**	**98**	**536**	**103**	**799**

Findings did provide evidence of nearly half (47/97, 48%) of these patients had some success in better managing their conditions (see figures 11 & 12). Using objective cut-off data (e.g., blood pressure, BMI, A1c level with blood glucose readings), provider notes in medical files, and general categories for outcomes, we found some improvement due to: 1) compliance with treatment plans (i.e., taking medications as prescribed; coded IMP-TX) and 2) improvements in lifestyle (e.g., losing weight, reducing or ceasing smoking; coded IMP-LIFE). We also found conditions that were nearly the same across individual patient's visits (coded SAME). Some patients declined in one or more conditions due to provider's notation of "noncompliant" (coded WORSE-NON) or worsened due to lifestyle contexts (e.g., gained weight, increased smoking, coded WORSE-LIFE). Totals in figure 14 do not add to N=97 because patients may have improved on one condition and grew worse on another or others.

Figure 11. General Categories of Changes in Health Status for Random Sample, N=97

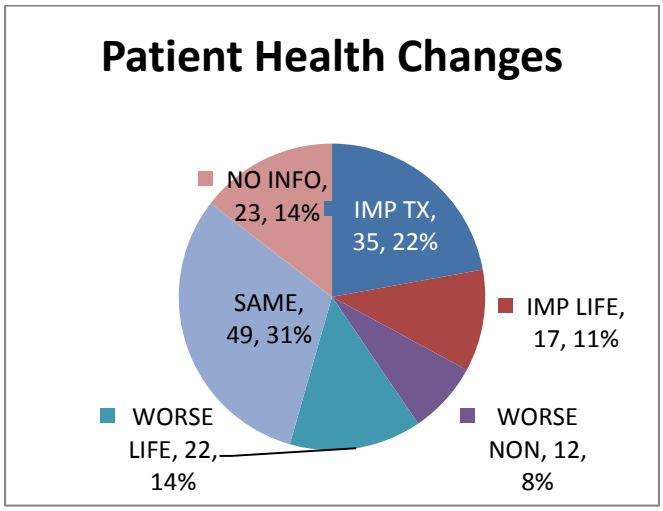


Table 6 illustrates this phenomenon with more detail among genders. The categories of change in the four health conditions are 1) Better, 2) Same, 3) Better & Worse, 4) Better & Same, 5) Same & Worse, 6) Better/Worse/Same, 7) Worse, and 8) NoInfo (not enough information to detect a change). More women (12% of females versus 2% of males) improved some component of the four conditions over the three years. Conversely, 14% of men (versus one female) tended to decrease or do worse

among the measured components of health status. The percentage of each gender whose health status remained about the same was equal at 19%. A couple examples may clarify these mixed results. Patient #101 rated Better & Worse because patient was able to control high blood pressure (BP) with medication compliance, but was unable to lose weight, going from overweight to obese from January 2012 to August 2014 (20 visits). Patient #94 rated a Better & Same, also maintaining BP control through meds, but had weight fluctuations from September 2012 to September 2014 through 13 visits, and made attempts to quit smoking but hasn't quit to date (e.g., quit for a month using a patch, smoked half-pack, smoke 2-3 cigarettes per day). Though patients improved in one measure, they were unable to improve on another.

Table 6. Changes in Health Status among Four Conditions for Random Selection of Patients, N=102

		MALES	FEMALES	
Better	0.05	2	7	0.12
Same	0.19	8	11	0.19
Better, Worse	0.05	2	9	0.15
Better, Same	0.19	8	12	0.20
Same, Worse	0.00	0	5	0.08
Better, Worse, Same	0.07	3	4	0.07
Worse	0.14	6	1	0.02
No Info	0.33	14	10	0.17
totals		43	59	

Figure 12 suggests that the number of visits by patients in the random group may have effected changes in health status. Among female in the first three categories that indicate some improvement, more visits appear linked to an improvement in one or more conditions, even with some function of health status remaining the same or worsening.

Figure 12. Random-Sample Patient Visits with Health Status Change by Gender

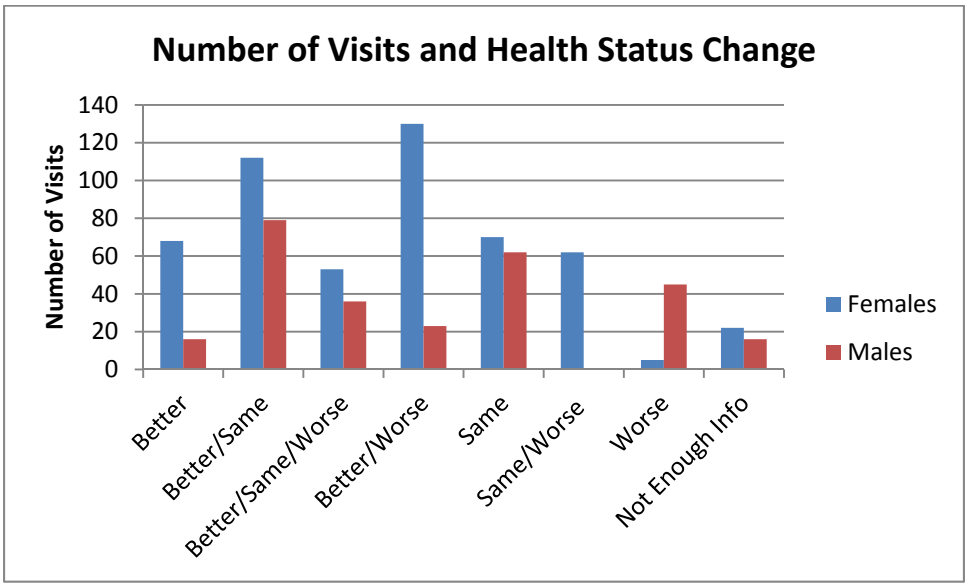


Figure 13 provides a glance at positive movement among the random sample regarding smoking. Fifty-three patients were smokers at some point during the three years, with five patients succeeding in cessation; hence, the total number of patients in this analysis differs from the count in diagnoses charts above. This analysis indicates that eight of the patients were not smokers or their records did not indicate smoking in October 2012. While 15% (8/53) made attempts or quit smoking, 85% (45/53) continued to smoking. Patients who continued to smoke include the four patients diagnosed with COPD, illustrating again the difficulty this population has in self-management of chronic conditions, as does the depiction in figure 14 regarding weight problems. This group includes overweight notation in the medical file (not just obesity), where the provider indicate weight loss would be helpful. Key stakeholders and providers indicated that they believe they are making progress across chronic conditions of this study except for obesity. Figure 14 somewhat confirms their concern, at least for this small group.

Figure 13. Smoking among Random-Sample Patients, with Attempts and Success of Cessation, N=53 of 102 (52%)

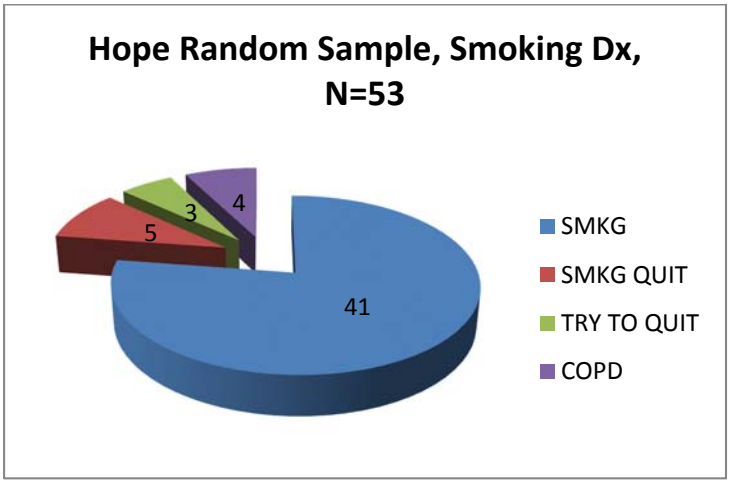
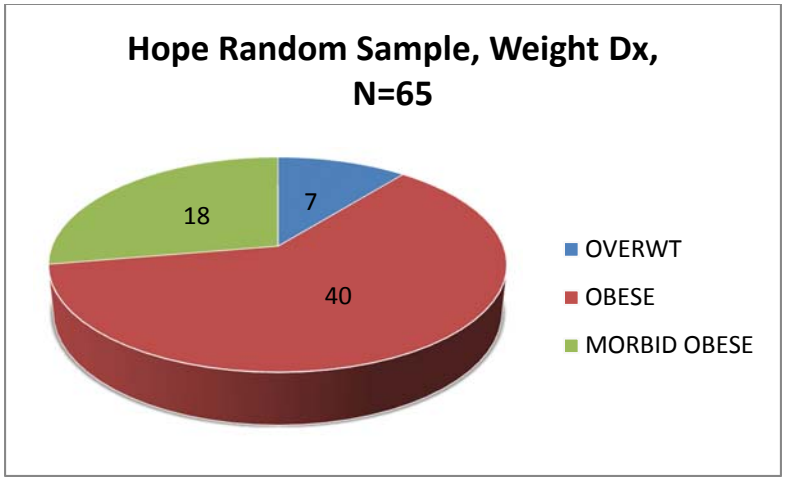
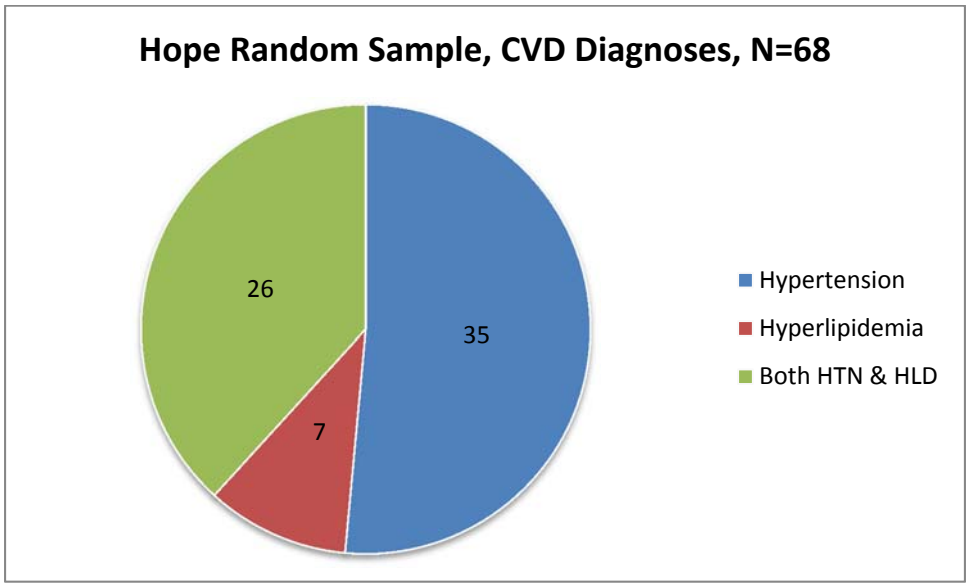


Figure 14. Number of Random-Sample Patients with Weight Problems, N=65 of 102 (64%)



Cardiovascular disease (CVD)—primarily hypertension (HTN) and hyperlipidemia (HLD)—was diagnosed slightly more frequently (67%) than obesity (64%) among the random sample of patients; the other conditions were diagnosed at 52% for COPD/smoking and 28% for diabetes and pre-diabetes. Figure 15 visualizes proportion of the 68 patients with CVD by HTN, HLD, or both conditions.

Figure 15. Cardiovascular Disease among Random-Sample Patients, N=68 of 102 (67%)

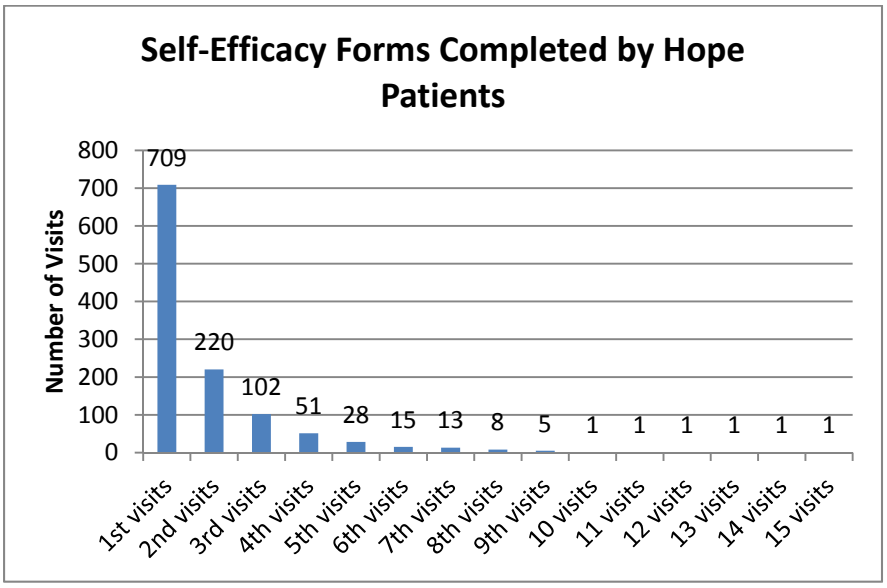


Self-Efficacy

At the study's inception, the evaluation team sought a measurement that would assist providers in understanding how well their patients might be managing the four conditions targeted by this project. The English version has six items (see Appendix E) and the Spanish version has four items. However, measuring self-efficacy (SC) never found a stronghold among providers, staff or patients. Patients complained about its repetitiveness (they originally were asked to complete the form prior to each visit); volunteer staff didn't always remember to include it in with the many forms new patients had to complete; and providers have been somewhat unable to focus on self-management of chronic disease due to immediate needs of patients' acute conditions. The following observations, therefore, are provided for Hope Health Clinic stakeholders to consider for SE's future potential.

From October 2012 through September 2014, approximately 1,157 SE forms were completed. These forms were recorded by patient per visit, thus illustrated in figure 20 by the patient's first visit, second visit, etc., up to one patient who completed the form before 15 visits. We provided SE mean scores per number of visits on each quarterly report since January 2013, which depicted a mixed outcome in terms of how self-efficacious patients perceived themselves – some patients indicated better, then worse, then better-again means; others didn't change from visit to visit; still others reported worse scores from visit to visit.

Figure 16. Number of Visits for which Hope Patients Completed Self-Efficacy Forms



Among the random sample of patients, 51 patients (52.6%, 51/97) completed SE forms for one visit (N=51) to 15 visits (N=1). Of these 51 patients, 27 of them completed the form on a second visit; 10 on a third visit; five on a fourth visit; and one patient (#41) completed the SE form prior to 15 visits (from November 2011 to August 2014). Patient #41 was diagnosed with all four conditions, had Rx-controlled hypertension, remained the same level of morbid obesity, made multiple attempts to quit smoking, and fluctuated on A1c levels. SE levels also fluctuated, with a low mean of 6.0 (out of a possible 10.0) at a time when the patient's file reflected increasing levels of A1c but decreases in smoking. By August 2014, Patient #41 scored a 9.0 mean on self-efficacy, with a corresponding maintenance of improved blood pressure but no change in smoking or weight. If the clinic chooses to continue using the SE measurement, the random sample's 51 patients provide evidence for making self-efficacy a focus of its educational programs, both for patients and for providers. As stakeholders continue to monitor Hope patients, and continue to gather longitudinal data through repeat visits, the clinic decision makers will be able to make better assessments of patients' intentions or perceptions they can maintain improvements in chronic diseases and conditions.

A Story of Three Patients

To gain increased understanding of the struggle Hope patients experience as they work with a host of providers and specialists to improve their level of health and ultimately self-manage chronic

conditions, a description of three patients from the random group may offer insight. Kate (not her real name) is 45, diagnosed in July 2012 with CVD (hypertension and hyperlipidemia) and, with a BMI of 31, is considered obese because she has an obesity-related condition (Highland Bariatric Surgery Center, 2014). Before her fourth visit, she scored a mean of 5.0 (out of possible 10) on the self-efficacy scale, indicating a lack of confidence in being able to manage her two chronic conditions. Her individual scores for the two forms she completed (July 2012 and September 2013) were:

Confident in preventing disease-related fatigue from interfering with things you want to do: 4.5 and 4.0
Confident in keeping physical discomfort or pain from interfering with things you want to do: 5.5 and 4.0
Confident in preventing disease-related emotional distress from interfering: 4.5 and 4.0
Confident in keeping other symptoms from interfering with things you want to do: 5.5 and 5.0
Confident you can do tasks and activities needed to manage your health condition: 5.5 and 4.0
Confident you can do more than taking medication to reduce illness affecting everyday life: 4.5 and 5.0

She was able to quit smoking just prior to becoming a Hope patient and has maintained acceptable levels for both HTN and HLD with medications. Kate's weight yo-yos, however, and is inching up, with a current BMI of 32. She has taken advantage of dental referrals, as the provider's strategy in improving her oral health and reducing the number of visits to treat sinus or other possibly oral-health related infections. Over the course of 13 visits, she completed the self-efficacy form again in September 2013, resulting in a lower mean of 4.5, perhaps a call for help with her weight problem. She praises Hope Clinic in glowing terms for assistance in "getting a handle on two big concerns: my high cholesterol and blood pressure. They've probably saved my life."

Jim also has problems with his weight, reaching a diagnosis of morbid obesity with a BMI of 40 by October 2013. With hypertension and diabetes, his health status has improved for both conditions, but he exercises little and experiences multiple infections and skin problems. Jim has been faithful about following up on referrals to specialists in cardiology, endocrinology, and spine imaging. For self-efficacy, Jim reported the following on two out of the eight visits recorded in his file:

Confident in preventing disease-related fatigue from interfering with things you want to do: 10 and 10
Confident in keeping physical discomfort or pain from interfering with things you want to do: 7 and 10
Confident in preventing disease-related emotional distress from interfering: 6 and 10
Confident in keeping other symptoms from interfering with things you want to do: 8 and 1
Confident you can do tasks and activities needed to manage your health condition: 7 and 10
Confident you can do more than taking medication to reduce illness affecting everyday life: 6 and 10

Jim scored means of 7.33 (November 2012) and 8.5 (May 2013) – for the score of 1 on the fourth item, Jim wrote in "No one can" keep other symptoms from interfering with things you want to do, though he scored an 8 on the item six months earlier). In May 2013, Jim had a corresponding drop in A1c level and

blood pressure. He believes Hope Clinic "has made a big difference in my life. I can't get over how much respect everybody shows each other and me." With a higher level of self-efficacy than Kate, he may be more receptive to small steps he could take to reduce his unhealthy weight.

Ellie, on the other hand, had a drop in her self-efficacy between December 2012 and January 2014:

Confident in preventing disease-related fatigue from interfering with things you want to do: 4 and 2
Confident in keeping physical discomfort or pain from interfering with things you want to do: 5 and 1
Confident in preventing disease-related emotional distress from interfering: 8 and 3
Confident in keeping other symptoms from interfering with things you want to do: 4 and 3
Confident you can do tasks and activities needed to manage your health condition: 3 and 4
Confident you can do more than taking medication to reduce illness affecting everyday life: 3 and 2

Rating a mean of 4.5 at a time when she was smoking more, having GI problems added to her diabetes, and weight approaching obesity (BMI of 29), her confidence in managing chronic diseases dropped to a mean of 2.5. She has visited Hope 14 times with multiple symptoms that are recorded by her providers as being related to her diagnoses: muscle pains, skin problems, sinus and ear infections, and possible rheumatoid arthritis. She has no means of getting to the UK clinic that could treat RA, and refuses to sit in smoking cessation classes at the health department. She did follow up on the referral to get a nicotine patch at the health department and is "down to just a pack a day. I tell you, these people are great. I thank my lucky stars the day Hope Clinic opened to help people like me."

Additional Patient Feedback

To obtain more of the story of Hope Health Clinic, we sought feedback from patients, first through a survey, followed by focus groups, and finally phone calls. As mentioned previously, the response rate for the mailed Patient Survey was very low, 8.8%. To learn more from these patients, the evaluation team attempted to call the remaining 93 patients. We made ten successful calls; 57 phone numbers were disconnected; 26 patients declined to answer questions. After consulting with the clinic administrator and grant's fiscal agent during a site visit by the Foundation for a Healthy Kentucky, we decided to conduct three focus groups of patients who were not in the randomly selected group. To accomplish this task, the clinic administrator agreed to open the clinic from 6:00-7:00 PM on nights when the clinic was usually closed; provide an incentive for participation; and selected and recruited patients (in consultation with the nurse and medical providers) for three groups: compliant (N=7), non-compliant (N=8), and Spanish-speaking (N=8) (total N=23). For the non-compliant patients who could not get to the focus group, we conducted telephone interviews. For the protocol, we used the Patient Survey for

the content of our discussion in order to obtain consistent information across the focus groups and the mailed survey respondents, with the addition of one final question: "What would you do differently at Hope Clinic if you were the boss?"

Through obtaining responses to the Patient Survey items, two focus groups lasted from 60 to 75 minutes, the non-compliant group ran 25 minutes, and the phone interviews each lasted 10-15 minutes. Overwhelmingly, patient feedback from the focus groups, the mailed survey, and the phone interviews was very positive, offering comments that credited the clinic with "saving my life" (N=5) and "helping me figure out what's wrong with my health" (N=12) to being treated with respect that they had not experienced in any other medical setting (N=15). On the other end, only one mailed survey and one phone respondent provided negative feedback; the mailed survey respondent indicated that the clinic "did nothing right" and the phone respondent said, "If I had wanted a sermon, I would have gone to church."

When asked what other services Hope Clinic could provide, the majority (61%) responded that nothing else was needed. Of the other respondents, services for a dentist at the clinic dominated the answers, with child care requested by seven patients. When asked what changes Hope would make "if you were boss," all respondents replied positively, very similarly to these examples: "They do such a wonderful job, I wouldn't change a thing" and "They do a wonderful job with the resources they have."

Social Network Analysis

Social network analysis was used to examine the Hope Health Clinic (HHC) healthcare provider social network. This analytical technique was used to explore the evolution of the HHC service delivery process, examining the network members and their exchanged resources within the social network.

As mentioned previously, the purpose of this study was to evaluate whether the holistic-based HHC, using a medical home model and navigation system, improved health outcomes and reduced healthcare costs for low-income, uninsured residents in its four-county service area. The study addressed the following research questions:

RQ1: How does a medical service network expand from an initial baseline state?

RQ2: How do patients with different needs and characteristics flow through a medical service network?

RQ3: How do different subgroups (e.g., cancer versus diabetic patients) flow through the network, and how can network density help service providers understand the network?

The study used social network analysis to measure the development of and outcomes associated with HHC healthcare delivery. HHC, with its collection of healthcare delivery providers, clinic staff, volunteers, and patients, represents a social network, and social network analysis was used to examine the network in multiple ways: identifying (a) which members existed within the network, (b) what relationships connected members together, (c) what resources were exchanged through these relationships, and (d) how the resource exchanges evolved over time. Social network analysis was used to gain a better understanding of the healthcare provider network and its resource exchanges, as the analytical technique was used to explore the clinic and its network members in more detail.

Data were collected from the HHC's Health Navigator patient referral logs, which provide information about the health services providers used and services obtained. The patient referral logs spanned two time periods: (a) Period 1 occurred from January 2012 to March 2013, and (b) Period 2 occurred from April 2013 to September 2014. These data provide information about the number of members joining the network, what relationships develop among them, and how they use relationships to share resources and provide services. This can be quantified via network density, or the ratio between the actual number of relationships within the network versus the maximum number of possible relationships within the network. Density values range from zero to one, where .000 indicates no relationships among network members and 1.000 reveals all members share direct connections to one another. Higher density values indicate information and resources can flow more quickly and efficiently through the network, while lower values indicate a slower and less efficient flow of resources (de Nooy et al., 2005). In this study, density values along with the number of nodes and relationships were examined to track the evolution of the HHC social network over time. Our specific results follow by each research question we posed.

RQ1: How does a medical service network expand from an initial baseline state?

The following quantitative data and sociograms provide details about the social network as it evolved over time.

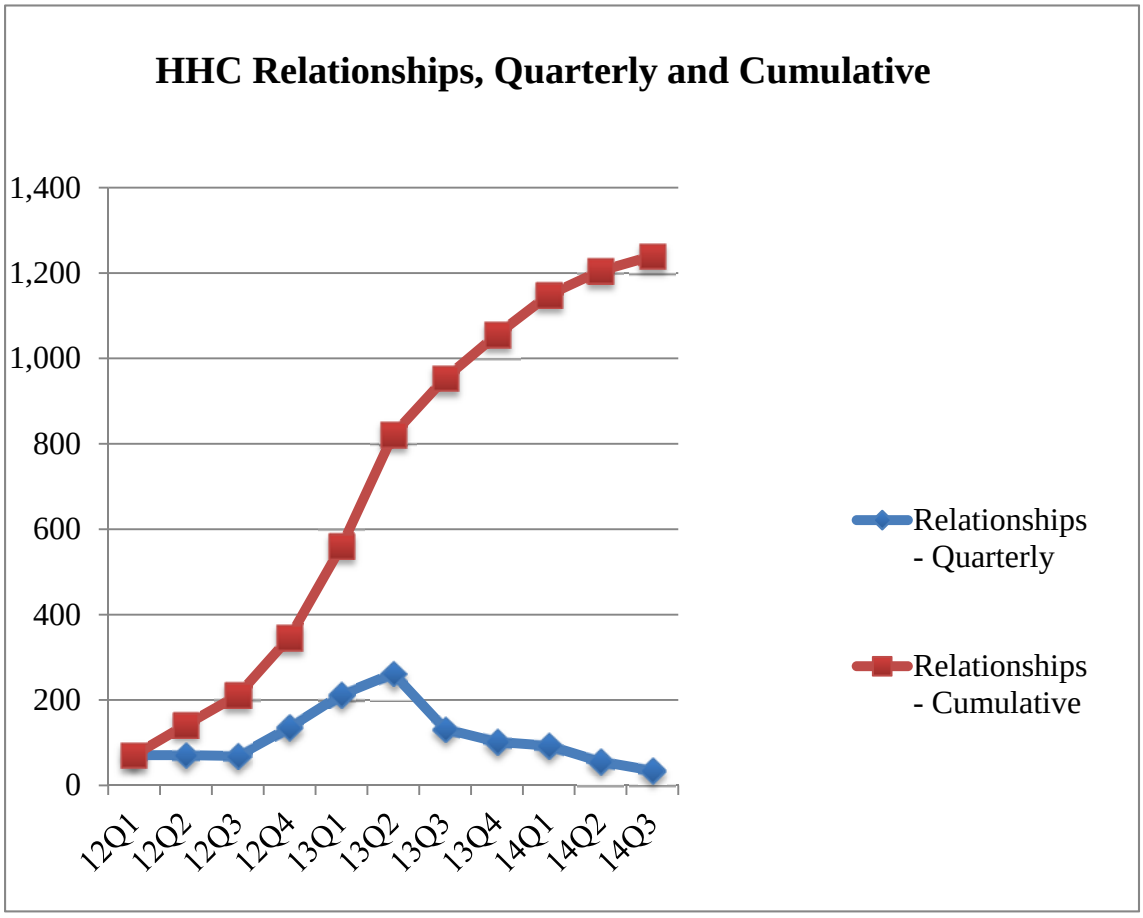
Period 1 - Quarter 1 2012 - Quarter 1 2013, Five Quarters of Referrals

The data provide evidence of the HHC provider network expansion over time as the number of new and existing clients used services across the network. Looking at the data by provider type reveals that the Local Network Specialists and UK Clinic offered the most services over the five quarters. As a baseline state, the first quarter of 2012 reveals the social network contained 80 members with six provider categories: (a) BHNE Clinic, (b) HD, (c) Local Network Specialist, (d) UK Clinic, (e) UofL, and (f) Other (see table 7), which shared 71 relationships, and each relationship was defined as a single interaction between a client and a network provider. Growth continued thusly:

First quarter	80 network members	71 relationships
Second quarter	75 network members	71 relationships
Third quarter	77 network members	69 relationships
Fourth quarter	111 network members	136 relationships
Fifth quarter	140 network members	213 relationships

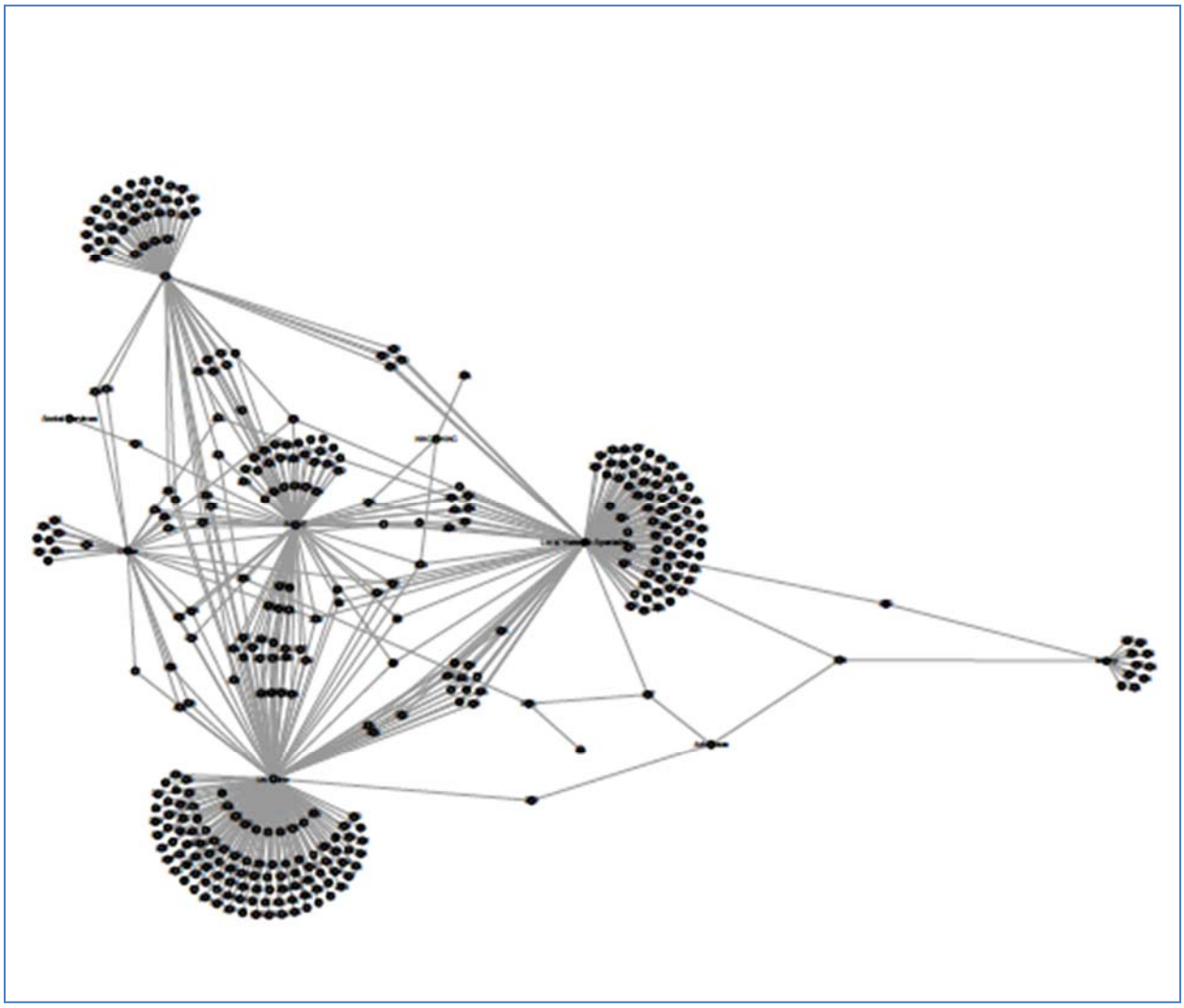
Figure 17 provides a visual of the above-described growth from January 2012 – September 2014.

Figure 17. HHC Network Relationships by Quarter and Cumulatively



Next, sociograms were used to display the network relationships visually among the clients and their individual relationships with network providers. To protect the privacy of clients, each individual was given a random identification number, as this would allow clients to be depicted in the social network without revealing their identities. Each client and network provider was displayed as a node, or circle, and the lines connecting two nodes represented the shared relationship between the client and the provider. The series of sociograms shows the evolution of the network over time, which are provided in the complete Social Network Analysis in the appendix. Here, figure 18 is the sociogram for the first period of analysis. The sociogram pattern most evident during this first period of analysis was the star pattern, where the network provider was located at the center of a circular figure with clients attached to the provider.

Figure18. Overall HHC Social Network for Period 1



Overall, this first period demonstrated cohesiveness across the network with a sizeable number of network members and relationships, which evolved over five quarters, resulting in multiple interactions among the providers and clients. The continued network growth highlights the potential benefits of bringing together network providers to offer a myriad of services to potential clients through collaborations among Local Network Specialists with the UK Clinic and BHNE Clinic, as patients were referred for an array of services from these providers. Because the network as a whole grew, the result reflects the desired strategic outcomes of the HHC stakeholders.

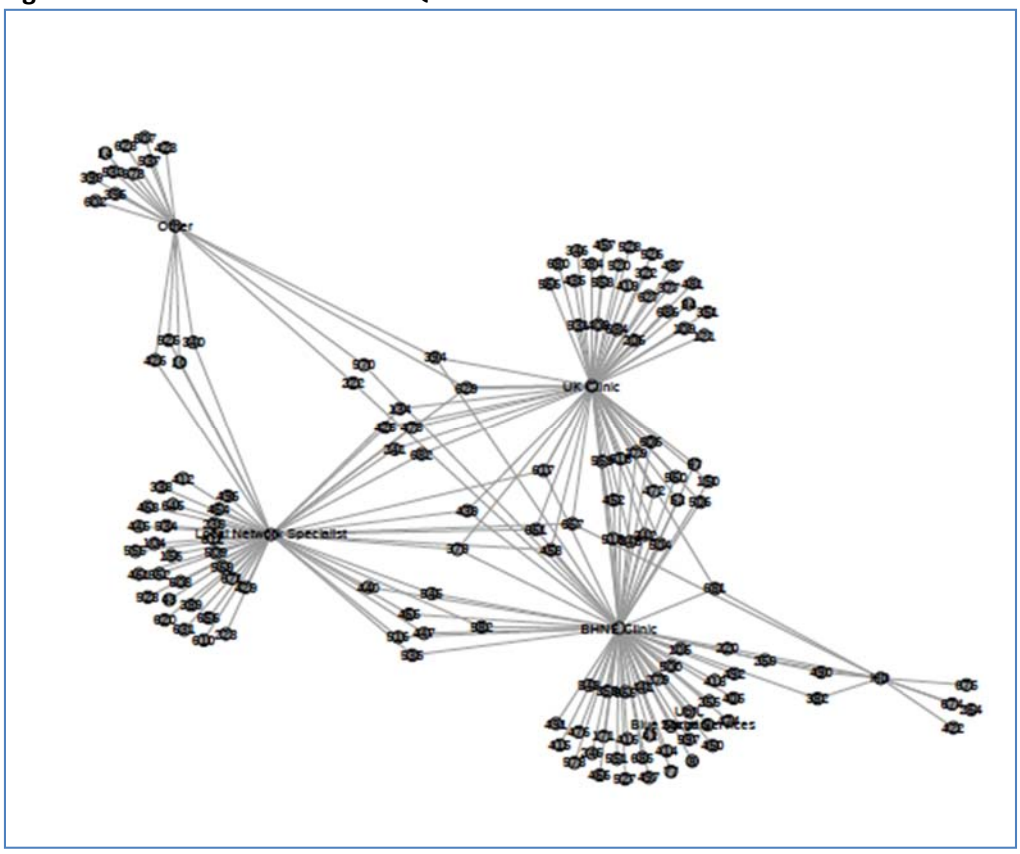
Period 2 - Quarter 2 2013 - Quarter 3 2014, Six Quarters of Referrals

A different pattern emerged during the second period of analysis. With the same six provider categories, network dynamics were:

First quarter	156 network members	262 relationships
Second quarter	87 network members	130 relationships
Third quarter	69 network members	102 relationships
Fourth quarter	72 network members	93 relationships
Fifth quarter	50 network members	56 relationships
Sixth quarter	35 network members	35 relationships

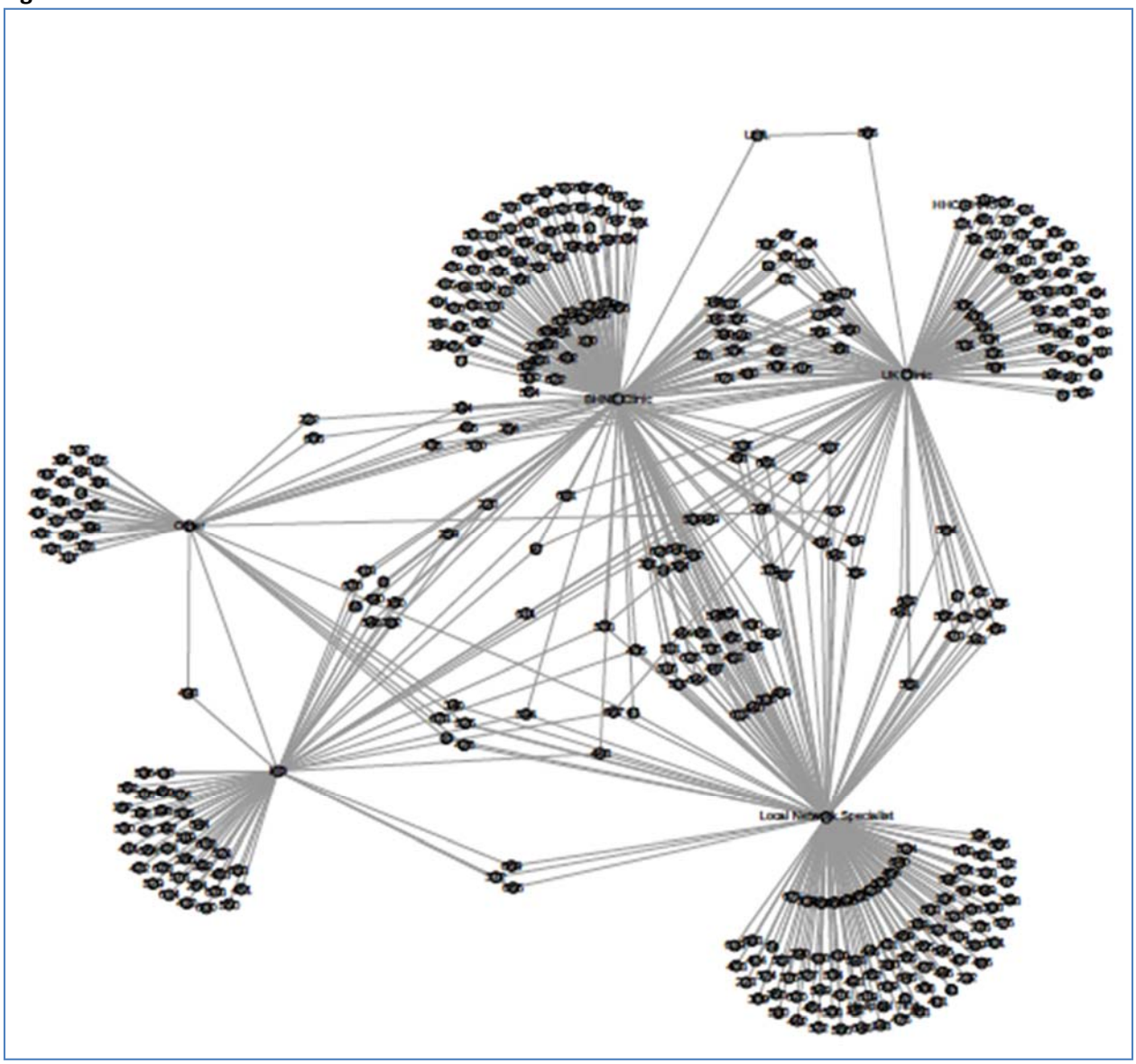
In comparison to the previous period, the data from the current period outlines the HHC provider network's contraction across the quarter as a more limited number of individuals took part in the network's services in comparison to the previous quarters. The network's growth peaked in the second quarter of 2013, attaining the largest number of individuals and relationships over Periods 1 and 2. However, the number of members and relationships within each quarter declined as the year progressed, and this tapering off continued into 2014. These results parallel the decrease in new and continuing patients seen at the clinic. The sociogram depicted in figure 19 illustrates the peak of network members and relationships.

Figure 19. HHC Social Network in Q2 2013



The final sociogram seen in figure 20 depicts the entire network at the end of Period 2. Similar to the final sociogram for Period 1, the final network revealed a relatively high level of cohesiveness among the network members and relationships. The number of new patients and relationships tapered off across the individual quarters during this period, yet the network as a whole remained stable and comprehensive. The sociogram highlights that patients continued to take advantage of the network providers and services. Assuming the growth trends remain the same, one would expect the network structure to exhibit a similar structure going forward.

Figure 20. Overall HHC Social Network for Period 2



The remaining research questions intended for SNA to address proved challenging to answer in detail.

RQ2: How do patients with different needs and characteristics flow through a medical service network?

RQ3: How do different subgroups (e.g., cancer versus diabetic patients) flow through the network, and how can network density help providers understand the network?

The sociograms and quantitative data provide somewhat limited insights into research questions 2 and 3 as they relate to specific client needs and characteristics, as well as how they might be served or flow through this social network.

From focus group results with key stakeholders (N=5), several factors were identified as influencing the network's expansion and contractions: 1) mistrust of patients to go beyond the walls of the clinic; 2) effect of the Affordable Care Act (ACA) on patients; and 3) extended time for exploration of other needed services, particularly dental and mental health services. "Mistrust of patients" was defined as the reluctance of patients to complete referrals outside the clinic walls or the immediate area of the local hospital and its offices of specialists. If patients had to travel outside their own communities, transportation was frequently mentioned as a reason not to go, particularly if the referrals were non-medical related, e.g., exercise classes, smoking cessation programs.

ACA was viewed, and still is, as a source of confusion and excessive cost by most Hope patients who discuss it with volunteers, staff, and providers. HHC's medical and administrative staff members attended multiple informational sessions locally and statewide to be able to explain its implications, answer patients' questions, and allay patients' fears. Because visits dropped sharply in the first quarters during ACA implementation in Kentucky, we knew some patients obtained insurance and found primary care physicians. However, we know some patients stayed away because they assumed the law required insurance, and HHC since its beginning didn't allow insurance. At the Fall Retreat in September 2013, the HHC Board of Directors decided to accept underinsured patients, after legal counsel reported that this acceptance would not change any part of its non-profit status. Once this word got out, patient visits began to increase gradually during subsequent quarters.

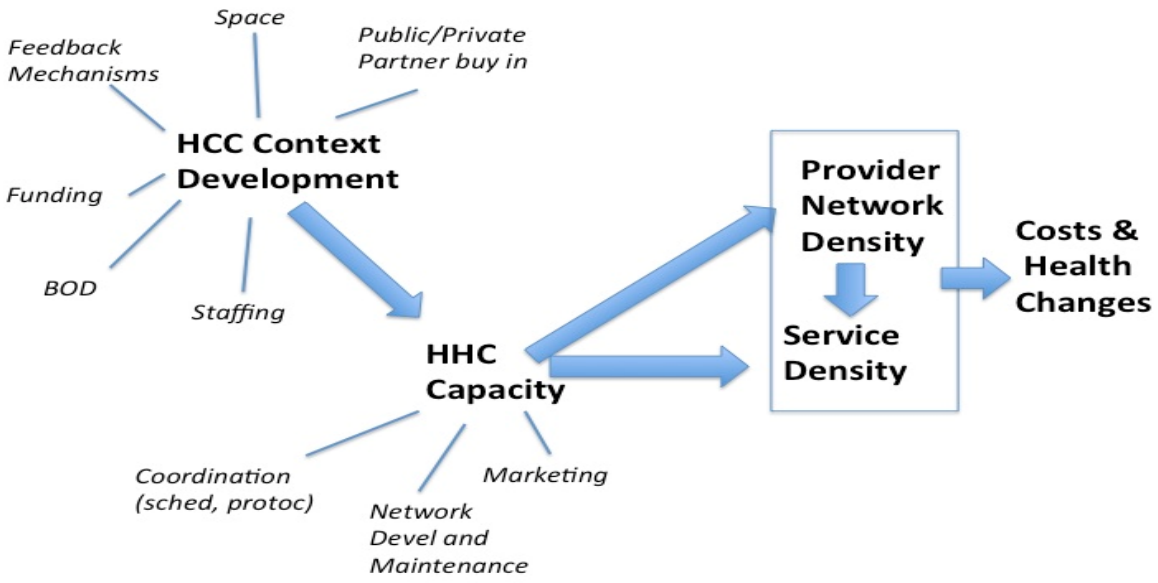
Extended time for seeking providers of other needed services had the apparent effect of diminishing the rapid network expansion of Period 1. The network expands through recruitment of additional providers – both medical and social services. Recruitment primarily has been focused on identifying dentists who can provide much-needed care, particularly for patients with diabetes or long-time tobacco abusers, among others; and for mental health professionals who could meet an unanticipated need by HHC's vision: patients with overwhelming issues of depression, anxiety, panic, and other distressing conditions brought on by poverty and co-morbidities.

Discussion and Implications of SNA in Understanding Hope Clinic Growth. Overall, the data provide insights into the HHC social network from a baseline perspective beg inning in the first quarter of 2012 and how it continued to evolve over a time period of 11 quarters. The sociograms and quantitative data offer clear evidence of the increase in network members and relationships, which allowed the network to grow over time. Although the number of new members and relationships tapered during this time, the network maintained cohesion and stability. The data also provided insights

as to which providers--in this case, BHNE Clinic, Local Network Specialists, and UK Clinic--offered the most services to clients within the network. The network's evolution reveals an opportunity for continued growth as more clients enter the network and take advantage of the myriad of services. Additionally, an opportunity exists for providers to collaborate more with one another as they provide a comprehensive menu of services to their clients over time.

Social network analysis, we believe, examined the Hope Health Clinic (HHC) healthcare provider network in enough detail to better understand the evolution of HHC service delivery, examining the network members and their exchanged resources within the social network. Applying the principles of the socio-ecological model, we understand that multiple, nested systems (also called layers of environment) influence the individual (Bronfenbrenner, 1979). Hope Health Clinic continues to seek to deliberately engage and integrate these systems which make up the social network in and around our four counties, to ensure the working-poor population in this rural region obtains the help needed as a means to improve the four chronic conditions challenging many Hope patients. Figure 21 presents the model we envisioned for Hope Clinic, a causal diagram of how these cross-level environments have been constructed and implemented, with their resulting longitudinal impact on individual health and system costs.

Figure 21: Pathways of Increasing HHC Capacity



Moving from left to right in Figure 35, the ongoing task of creating and sustaining this clinic is graphically represented by the multiple small lines emanating from HHC Context Development. Based on Hope Clinic's vision, the network was designed around the model that depicts the multiple needed components and connections that have been receiving attention during the clinic's first three years, the developmental and implementation phases. From the initial HHC Context Development, Hope Clinic has documented the following: 1) opened a medical office; 2) established a Board of Directors to oversee this non-profit entity with IRS designation 501(c)(3) and replaced it with a non-profit in the name of Hope Health Clinic; 3) recruited a staff with clinical and non-clinical volunteers that include its Medical Director, six other physicians and a nurse practitioner, and community volunteers; 4) recruited and hired four paid positions: two half-time Nurse Practitioners, one half-time nurse/patient navigator, and the full-time clinic administrator; 5) developed numerous local funding sources (a generous mix of public and private partners) and the Foundation for a Healthy Kentucky; and 6) retained the services of a skilled evaluation team from the University of Louisville who provided data collection, analyses and feedback mechanisms for improvement in services and outreach. From an organizations/systems baseline of zero, this human and operational resource implementation phase has laid the foundation for ongoing increases in HHC Capacity:

1. The detailed coordination of schedules and protocols across a brigade of volunteers at the clinic site and across four counties;
2. the ongoing development and maintenance of a service network broad enough to provide high-quality, holistic healthcare for an average of 3,000 patient visits annually; and
3. the marketing and outreach necessary to attract sustained funding and increased awareness of services for the targeted population.

Cost Reductions for Hospital Emergency Room Usage

As the clinic moved through its first three years, Hope stakeholders continued to provide resources to help patients, who are expected to increase self-efficacy managing their health problems through Hope Clinic's holistic approach to wellness. At more distal (impact) outcomes, we have found parallel changes in cost reduction at the system/clinic level and health improvements for the four major conditions under investigation. Ultimately we have measured these changes using available community-level and clinic/hospital provider secondary data sources.

Hospital emergency room data from Baptist Health LaGrange provide evidence of this reduced cost. Though data categories changed from Year 1 of the study to its current quarterly summaries, tables 7 – 10 provide periodic snapshots of the reduced levels of ER use for non-emergencies, depicted here as ER Level 1 (table 7) and ER Level 0 and Level 1 (tables 8-10). Looking at Total ER Visits under the Hope Clinic Patients column in table 7, Hope patients represented a fraction of *all* ER visits, from .007% in Quarter 1 of 2011 to .017% in Quarter 4 of 2012 (Year 1 of our study). These general ER data weren't as meaningful for clinic stakeholders, which resulted in specifying data at ER Level breakdowns. Subsequently, table 8 indicates 8.29% of Hope patients from April 2013 to June 2013 used ER services, *though none of these visits were for non-emergencies*. The same quarter a year later, the percentage of Hope patients dropped to 5.39%, again without any non-emergencies. Midway between these two quarters, 7.04% of ER use was by Hope patients, with only one visit for a non-emergency. For all the dedicated community volunteers, medical providers, and funders across the four-county area, these data are robust pieces of evidence of realizing a primary goal for Hope Clinic.

Table 7. Hospital ER Visits by Hope Clinic Patients, Year 1 of Study

Month/Quarter	ER Level 1 – non-emergency	Total other ER visits, emergencies	Inpatient Admits	All ER Visits	% of all ER visits by Hope patients
Oct 2011	13	6	0	1,187	0.0051
Nov 2011	30	9	1	1,219	0.0074
Dec 2011	26	11	2	1,144	0.0096
Quarter 1 subtotals	**69**	**26**	**3**	**3,550**	**0.0073**
Jan 2012	74	12	0	1,316	0.0091
Feb 2012	88	14	1	1,191	0.0118
Mar 2012	73	12	0	1,306	0.0092
Quarter 2 subtotals	**235**	**38**	**1**	**3,813**	**0.0100**
Apr 2012	79	23	2	1,254	0.0183
May 2012	75	16	1	1,413	0.0113
June 2012	54	32	6	1,203	0.0266
Quarter 3 subtotals	**208**	**71**	**9**	**3,870**	**0.0183**
July 2012	49	24	5	1,306	0.0184
Aug 2012	46	22	1	1,304	0.0169
Sep 2012	45	20	0	1,220	0.0164
Quarter 4 subtotals	**140**	**66**	**6**	**3,830**	**0.0172**

Table 8. Comparison of Hospital ER Visits by Hope Clinic Patients, Year 2, Qtr 3

	4/1/2013 to 06/30/2013	
	Self Pays	HHC pts
870255 TRIAGE ONLY NEW PATIENT (ED)	3	
870259 TRIAGE ONLY ESTAB PATIENT (ED)	17	
870261 ER LEVEL 0 (ED)	7	
870247 ER LEVEL I (ED)	0	
870248 ER LEVEL II (ED)	55	3
870249 ER LEVEL III (ED)	515	40
870250 ER LEVEL IV (ED)	198	21
870251 ER LEVEL V (ED)	24	4
870252 ER LEVEL VI INITIAL 74 MIN	1	**Qtr: .0829**

Table 9. Comparison of Hospital ER Visits by Hope Clinic Patients, Year 3, Qtr 1

	10/1/2013 to 12/31/13	
	All Self Pays	HHC pts.
870255 TRIAGE ONLY NEW PATIENT (ED)	2	
870259 TRIAGE ONLY ESTAB PATIENT (ED)	7	
870261 ER LEVEL 0 (ED)	3	1
%870247 ER LEVEL I (ED)	1	
870248 ER LEVEL II (ED)	40	3
870249 ER LEVEL III (ED)	362	22
870250 ER LEVEL IV (ED)	163	15
870251 ER LEVEL V (ED)	19	1
870252 ER LEVEL VI INITIAL 74 MIN		**Qtr: .0704**

Table 10. Comparison of Hospital ER Visits by Hope Clinic Patients, Year 3, Qtr 3

	4/1/2014 to 06/30/2014	
	All Self Pays	HHC pts
870255 TRIAGE ONLY NEW PATIENT (ED)	8	
870259 TRIAGE ONLY ESTAB PATIENT (ED)		
870261 ER LEVEL 0 (ED)	9	

870247 ER LEVEL I (ED)	0	
870248 ER LEVEL II (ED)	15	2
870249 ER LEVEL III (ED)	132	5
870250 ER LEVEL IV (ED)	33	4
870251 ER LEVEL V (ED)	7	
870252 ER LEVEL VI INITIAL 74 MIN		**Qtr: .0539**

The social analysis exploration has aided in evaluating the consequences of the community health clinic and its intended network of providers for increasing access to quality healthcare, examining the service density of care among low-income and uninsured patients with chronic conditions, and reducing the costs of care, especially as it shows up in a reduction of non-emergency ER care. Information stemming from these data help make sense of what is going on in the social network as these services are provided. Instituting such a feedback mechanism helps the people shaping the network to make more informed decisions.

The workforce continues to grow to meet the number of patients. Medical providers (volunteers) who see patients regularly at the clinic have increased from six on opening day to eight as of September 2014. Sixty volunteer medical providers and nine other service providers (see appendix C) represent a consistent growth of provider network density across quarterly calculations. Specialties and other services include: addiction treatment, anger management, counselors, a social worker, clinical psychologist, therapist, dentist, audiologist, and pastoral counseling. Service density also continues to increase, with 1,244 referrals made over the three-year period. (We defined "service density" as number of completed referrals by patients in the provider network.) Coupled with provider network density, level of saturation has been expressed quantitatively. We have been unable to confirm referral completions with a high degree of certainty, but continue to assert completed referrals, if a notation in the referral log does not indicate "no show" or "rescheduled." The number of community volunteers (nursing, clerical, cleaning, landscaping) has grown to 45, with detailed training provided within the first 30 days for volunteers who work directly with patients or their medical records. The enthusiasm for its mission and respectful care of patients are palatable among the busy volunteers on any given day at the clinic. Typical patient comments include ones similar to a statement made during a recent focus group: "I've never been treated respectfully at any medical office before coming to Hope Clinic."

Table 11. Referrals through September 2014, Coded by Provider Type

Provider	Freq.	%
Oldham Co Health Department (smoking cessation, diabetes educ., gynecology)	115	9.24
UK Clinics – various specialties incl. urology, pain, hepatitis, hand surgery	367	29.5
Local network specialists incl. cardiology, dermatology, dentist	319	25.64
Hospital for test (separate category through 4-1-13)	92	7.4
Health Advocate	3	0.24
Baptist Health LaGrange, clinics, tests, etc. at hospital	266	21.38
UofL	4	0.32
Health departments in Henry, Trimble & Carroll counties	13	1.05
HHC – for mental health counselors who meet clients at HHC	2	0.16
Mercy Clinic, Shelbyville	12	0.96
Blue Surgery Clinic	1	0.08
Social services	12	0.96
PHHC – same as HHC on next line	1	0.08
Other: Lyons Eye Institute, Norton Oncology	3	0.24
Missing ID or unknown	34	2.73
Total	1244	100.0

IV. Discussion

The results obtained over the course of the three-year project indicate evidence of the, in the words suggested by several patients and volunteers, “miracles” occurring at Hope Health Clinic. The primary goal has been achieved: low-income, working poor residents of four rural counties now have access to quality health care. An important objective was met: According to the data, hospital emergency room use by Hope patients is now limited to authentic emergencies, resulting in decreased costs for primary care and lower hospital admission rates for chronic conditions among the area’s uninsured, underinsured, and low-income residents. An unexpected outcome likely is partially responsible for this achievement: ER physicians are regularly overheard referring qualified patients to Hope Clinic for primary care.

The social network analysis has confirmed the stability of sustained growth in Hope reaching beyond its walls to meet patients’ health needs. The clinic administrator affirms that patients’ concern about ACA caused a drop in visits and referrals, but the SNA shows a robust, continuing relationship development among the numerous network members that will sustain quality care well into the foreseeable future. Medical providers speak openly of recruiting colleagues to continue the growth of

volunteers across specialties. The annual appreciation dinner is bolstered with financial reports and patient testimonials that physicians use to convince others to contribute time or other resources.

Direct observations at the clinic while gathering data confirmed repeated comments from patients over the three years: respectful treatment is universal among providers, volunteers, and the patients themselves. Patients are giving back. One woman and her children weekly brought in vegetables from their garden as a means of paying back the generosity of care she experiences at Hope. It was a bountiful display from early spring to late summer that encouraged the patients to partake of healthier choices.

Assessing patient outcomes was the most challenging element to evaluate. Lack of an electronic medical records system required reliance on paper records that could not always be located, and rethinking best ways to objectively gather as much medical and qualitative data as possible to answer the posed research questions from the SEP. Some answers have been unobtainable; we cannot determine specifics about whether county of residence or type of chronic condition affects patient outcomes.

Using the general categories we constructed as a measurement of change in chronic conditions for the random sample, we confirm perceptions of providers and clinic staff that the clinic has mixed results in helping patients manage their health. Patients and providers resoundingly agree that acute conditions are treated immediately, and staff finds a way to eliminate barriers to provide needed services. It remains unclear whether self-efficacy measurement will assist providers and staff in helping patients better manage their chronic conditions. The measure provides a snapshot of the patient's perception of being able to make a difference in their lives without sole reliance on medications. Patients expressed frustration in phone calls about not understanding the need to answer the six items on the SE form.

Limited resources—time, volunteers to assist with educational programs and activities, space—were mentioned frequently, informally and formally, as the greatest challenge to serve more patients with more services. Staff supplants these limitations with creative solutions that chip away at the overwhelming odds faced by Hope patients: recruiting nursing students to develop and deliver diabetes educational sessions in a tent erected on the parking lot to accommodate the large number of patients willing to find out more.

V. Lessons Learned and Recommendations

Patients express hope that they will get better: “Hope Clinic showed me what to do for all the things going wrong with my health. I’ve never seen any clinic like this,” said a Spanish-speaking patient. A patient with chronic depression expressed, “I’m confident they’re here to help, without being judgmental, just focusing on let’s get this problem resolved.”

The clinic could not be better named. The critical lesson learned for Hope Health Clinic is that fulfillment is achieved by the persistent commitment for responding to expressed patients’ needs. The ears of the clinic administrator, the Board, and key volunteers are ever vigilant to pick up on these expressions, often not stated by the patient in need. Impromptu discussions occur on the spot as these signs of need are identified, often with the clinic administrator knowing someone in her broad network who can be called upon to lead the solution. One example is the need for finding ways for poor patients to access costly medications. Inquiries resulted in obtaining delivery of free drugs on a regular basis that can be dispensed at the clinic (approximate value over the three years exceeded $2 million, clearly an outcome of high interest to patients and providers). These medications are in addition to the formal KPAP system for which most low-income patients qualify, resulting in very low cost for life-saving and chronic pain-reducing medications.

A sad lesson for staff and providers has been the inability for patients to reduce levels of obesity; the data from the random sample suggest that weight gain is the norm. Decision makers are seeking resources such as volunteer wellness coaches to work one-on-one with patients to help them with intractable weight problems. A first recommendation would be for the Operations Council to devise strategies for weight reduction, especially among the patients diagnosed as morbidly obese. Focus group participants suggested exercise classes of some kind be held at the clinic; where, in what space, is the challenge. Nursing students designed a walking map around the hospital and clinic grounds. Finding ways to get patients on the walkway would be a small step toward better health.

Although self-efficacy assessment forms are no longer being obtained from patients, better self-management of chronic conditions remains an important goal for Hope patients. Medical providers may need a refresher on the importance of self-efficacy in patients reaching effective management of chronic conditions. Without their commitment to assisting patients with self-efficacy, providers will have to rely on acute measures to solve chronic conditions. Self-efficacy strategies could be a useful

mechanism for patients to help themselves back to better health without overburdening this essential health care resource.

Though Hope has a robust network of specialists, it has not become a clinic without walls as originally conceived. Transportation is still frequently cited as a problem for making visits and completing referrals, indicating that patients need to find rides and have asked for a van or bus service to be considered in the future. If such a service could be provided, more referrals for the area's smoking cessation, exercise and nutrition activities, and other needed social services would give patients a greater chance of becoming healthier. The advent of the new non-profit status for Hope Health Clinic may provide another phalanx of volunteers from churches across the other three counties that can devise ways to get patients to the help they need. According to an interview with five key stakeholders, the original agency who oversaw the development and implementation of Hope Clinic—the Oldham County Ministerial Association—has been perceived by the faith community in the other participating counties as focusing only on Oldham County churches and, therefore, Oldham County residents. The perception limited participation among much-needed volunteers from Trimble, Henry and Carroll counties – and monetary support from its churches and other organizations. Since Hope Clinic is now its own non-profit, small increases in support and volunteers have begun since July 2014.

Inspiration meets the patient when walking into Hope Health Clinic. Greetings include positive banners that address the clinic's mission: To be of help and of hope; patients' photos with personal testimonials about their experiences; and smiling volunteers who speak softly and exude a respectful demeanor for every patient. The data document that HHC efforts extend beyond its walls, though efforts toward sustainability must continue to reach a broader representation in three of the four counties (Henry, Trimble and Carroll), to prevent Oldham County residents getting frustrated in aiding patients from beyond its borders. Key leaders believe that establishing a satellite in Trimble or Carroll will draw support for a more local site, and efforts continue to seek funding for expansion.

Expansion is underway, fortunately, on the grounds itself. Baptist Health LaGrange has donated additional space adjacent to the current clinic that is planned for dental services and space for educational classes. A continuous flow of nursing students provide much-needed support for diabetes education and weight management through improved nutrition and exercise encouragement. An intern fluent in Spanish supplants two volunteer interpreters to assist the growing number of Spanish-speaking patients.

The current clinic administrator provides the kind of leadership and management suited to the clinic's mission and needs: she has a background that includes 20+ years of experience working in a ministry environment and four years at a rural health clinic, shown to be essential to the clinic's growth and reach. The "patient navigator" role continues to be shared by the half-time nurse and two key volunteers who make appointments for provider referrals. These staff members make calls to encourage patients' referral completions and address the variety of patients' needs. Although Health Advocates were trained during Year 1, they lacked exposure to patients at the clinic and primarily used phone calls to connect with patients. The patients expressed a lack of trust with these well-meaning advocates, since they had never met in person. Plans to have advocates at the clinic will meet this disparity, though the number of volunteers needed for this ambitious strategy is still being recruited.

HHC remains open more than 40 hours per week. Meeting patients' needs is the compelling rationale for staying open longer than posted hours, primarily to accommodate patients' work schedules. This clinic's paid staff and volunteers are synchronized to a high degree in following the same mission: hear about a need, find a solution. As patients express concerns, the clinic administrator shows determined leadership in listening carefully to staff and volunteers to find feasible, sustainable responses. The example of educational sessions for 25-30 patients at a time illustrates this achievement: No room exists in the clinic building for such a large group of patients, so nursing students worked with the clinic administrator to use a large meeting tent in the parking lot for the sessions. The collaboration among volunteers, staff and community members creates this seamless integration of identifiable and creative resources with patients' needs.

A trained referral specialist is envisioned for the volunteer staff in the future; as discussed in previous reports, the nurse hired as the patient navigator primarily focuses on triage and making medical referrals—clearly identified as best uses for her skills. Health Advocates trained to provide referral information have not been viable in current form (few are found in referral logs, less than 1%); rationale provided earlier likely explains this gap. When advocates begin to work with patients at the clinic, different outcomes are expected. As mentioned, a formal proposal has been developed by the Operations Council that provides a three-tiered strategy for ensuring advocacy becomes a primary focus for the clinic. Finding time and the volunteers to implement this project are the current challenges.

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Appendix A. Hope Health Clinic Patients' Demographics: October 2011- March 2013

	Response options	Oct-Dec 2011	Jan-Mar 2012	Apr-Jun 2012	Jul-Sep 2012	Oct-Dec 2012	Jan-Mar 2013	Total	Distribution
Gender	Male	52	86	89	80	46	53	469	35%
	Female	104	159	148	178	91	89	877	65%
	Total	156	245	237	258	137	142	**1346**	
Age	< 5 years	0	1	0	0	0	0	1	0%
	5 - 18 years	0	1	0	1	1	2	6	0%
	19 - 39 years	59	104	129	138	59	72	645	48%
	40 - 64 years	96	135	107	119	76	68	683	51%
	65+ years	1	4	1	0	1	0	11	1%
	Total	156	245	237	258	137	142	**1346**	
Race	White/Caucasian	143	206	199	215	126	107	1132	84%
	Black/African-American	1	3	5	9	3	7	35	3%
	N. Amer./HI or API	2	1	1	0	0	1	8	1%
	Asian	1	0	0	0	0	1	2	0%
	Missing/Declined	9	35	32	34	8	26	169	13%
	Total	**156**	**245**	**237**	**258**	**137**	**142**	**1346**	
Ethn.	Hispanic	9	35	32	34	8	26	169	13%
	Non-Hispanic	147	210	205	224	129	116	1177	87%
	Total	**156**	**245**	**237**	**258**	**137**	**142**	**1346**	
Lang.	English	151	231	237	246	133	125	1280	95%
	Spanish	5	14		12	4	17	66	5%
	Total	**156**	**245**	**237**	**258**	**137**	**142**	**1346**	

	Response options	Oct-Dec 2011	Jan-Mar 2012	Apr-Jun 2012	Jul-Sep 2012	Oct-Dec 2012	Jan-Mar 2013	Total	Distribution
Income (% FPL)	**100% or less**	**84**	**104**	**37**	**17**	**101**	**123**	**595**	**44%**
	101% - 150%	29	81	20		14	13	192	14%
	151% - 200%	3	0	0	2	13	6	31	2%
	More than 200%	0	0	0		9	0	9	1%
	Missing/refused	40	60	180	239	0	0	519	39%
	Total	**156**	**245**	**237**	**258**	**137**	**142**	**1346**	
Insurance/ Payment Type	Uninsured	156	245	237	258	137	142	1346	100%
	Medicaid	0	0	0	0	0	0	0	0%
	Medicare	0	0	0	0	0	0	0	0%
	Private Insurance	0	0	0	0	0	0	0	0%
	Total	**156**	**245**	**237**	**258**	**137**	**142**	**1346**	
County or Residence	Oldham				555	72	80	791	59%
	Trimble				113	15	17	167	12%
	Carroll				48	9	12	90	7%
	Henry				169	37	31	281	21%
	Jefferson				6	4	2	12	1%
	Owen				1	0	0	1	0%
	Shelby				4	0	0	4	0%
	Total				**896**	**137**	**142**	1346	

Hope Health Clinic Patients' Demographics: April 2013-September 2014

	Response options	Apr-Jun 2013	Jul-Sept 2013	Oct-Dec 2013	Jan-Mar 2014	Apr-Jun 2014	Jul-Sept 2014	Total	Distribution
Gender	Male	63	55	60	27	46	30	281	38%
	Female	108	109	67	57	49	70	460	62%
	Total	171	164	127	84	95	100	**741**	
Age	< 5 years	0	0	0	0	0	0	0	0%
	5 - 18 years	1	0	2	1	2	3	9	1%
	19 - 39 years	84	79	63	45	43	63	377	51%
	40 - 64 years	82	84	61	38	45	32	342	46%
	65+ years	4	1	1	0	5	2	13	2%
	Total	171	164	127	84	95	100	**741**	
Race	White/Caucasian	136	157	90	64	62	47	556	75%
	Black/African-American	7	4	3	1	2	2	19	3%
	N. Amer./HI or API	3	2	1	0	0	0	6	1%
	Asian	0	1	2	0	0	0	3	0%
	Missing/Declined	25	0	31	19	31	51	157	21%
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	
Ethn.	Hispanic	25	30	31	19	31	51	187	25%
	Non-Hispanic	146	134	96	65	64	49	554	75%
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	
Lang.	English	157	145	100	67	73	64	606	82%
	Spanish	14	19	27	17	22	36	135	18%
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	

	Response options	Apr-Jun 2013	Jul-Sept 2013	Oct-Dec 2013	Jan-Mar 2014	Apr-Jun 2014	Jul-Sept 2014	Total	Distribution
Income (% FPL)	100% or less	129	132	97	62	69	82	571	77%
	101% - 150%	35	28	17	19	25	15	139	19%
	151% - 200%	7	4	13	3	1	3	31	4%
	More than 200%	0	0	0	0	0	0	0	0%
	Missing/refused	0	0	0	0	0	0	0	0%
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	
Insurance/ Payment Type	Uninsured	171	164	127	75	89	96	722	97%
	Medicaid	0	0	0	2	0	0	2	0%
	Medicare	0	0	0	4	0	0	4	1%
	Private Insurance	0	0	0	3	6	4	13	2%
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	
County or Residence	Oldham	84	94	74	49	49	58	408	55%
	Trimble	22	13	13	7	9	8	72	10%
	Carroll	21	20	12	10	11	13	87	12%
	Henry	44	32	26	14	19	14	149	20%
	Jefferson	0	4	2	4	6	5	21	3%
	Owen	0	0	0	0	0	0	0	0%
	Shelby	0	0	0	0	0	2	2	0%
	Missing/Other	0	1	0	0	1	0	2	
	Total	**171**	**164**	**127**	**84**	**95**	**100**	**741**	

Appendix B. Hope Health Clinic: Referrals January 2012 – March 2013

1. Tabular Breakdown of Referrals by County for Each Quarter

County[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	38	53.5	60.3	60.3
	Trimble	8	11.3	12.7	73.0
	Henry	11	15.5	17.5	90.5
	Carroll	5	7.0	7.9	98.4
	Jefferson	1	1.4	1.6	100.0
	Total	63	88.7	100.0	
Missing	System	8	11.3		
Total		71	100.0		

a. quarter = Jan 2012 -Mar 2012

County[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	39	54.9	58.2	58.2
	Trimble	12	16.9	17.9	76.1
	Henry	11	15.5	16.4	92.5
	Carroll	5	7.0	7.5	100.0
	Total	67	94.4	100.0	
Missing	System	4	5.6		
Total		71	100.0		

a. quarter = Apr 2012 - Jun 2012

County[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	40	58.0	63.5	63.5
	Trimble	6	8.7	9.5	73.0
	Henry	10	14.5	15.9	88.9
	Carroll	6	8.7	9.5	98.4
	Owen	1	1.4	1.6	100.0
	Total	63	91.3	100.0	
Missing	System	6	8.7		
Total		69	100.0		

a. quarter = Jul 2012 - Sept 2012

County[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	79	58.1	61.2	61.2
	Trimble	21	15.4	16.3	77.5
	Henry	20	14.7	15.5	93.0
	Carroll	4	2.9	3.1	96.1
	Jefferson	5	3.7	3.9	100.0
	Total	129	94.9	100.0	
Missing	System	7	5.1		
Total		136	100.0		

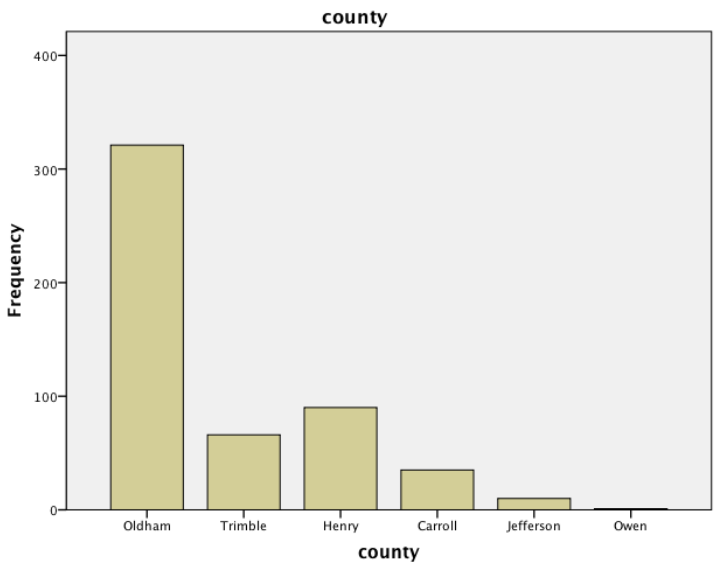
a. quarter = Oct 2012 - Dec 2012

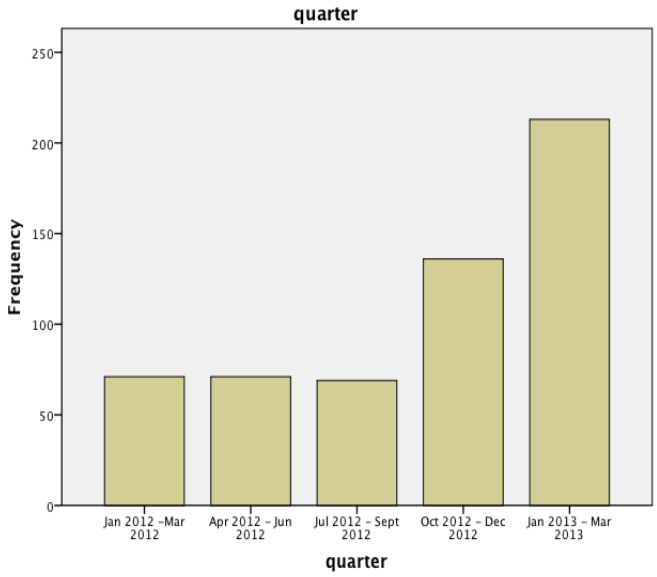
County[a]

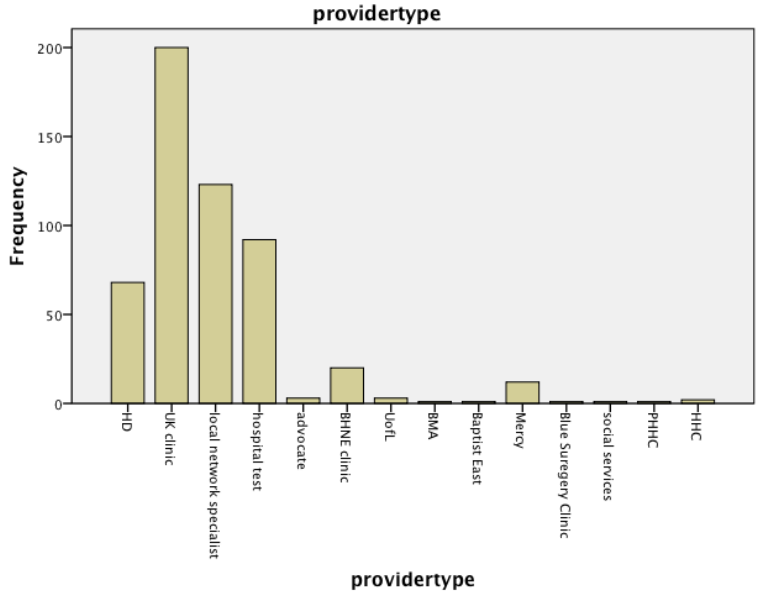
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	125	58.7	62.5	62.5
	Trimble	19	8.9	9.5	72.0
	Henry	37	17.4	18.5	90.5
	Carroll	15	7.0	7.5	98.0
	Jefferson	4	1.9	2.0	100.0
	Total	200	93.9	100.0	
Missing	System	13	6.1		
Total		213	100.0		

a. quarter = Jan 2013 – Mar 2013

2. **Graphs of Quarterly Referrals: by County, by Quarter, and by Provider**







3. Percentage Follow-through on Referrals by Quarter

Fol-thru [a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	patient did not follow through	4	5.6	9.1	9.1
	patient followed through or rescheduled	40	56.3	90.9	100.0
	Total	44	62.0	100.0	
Missing	System	27	38.0		
Total		71	100.0		

a. quarter = Jan 2012 -Mar 2012

Fol-thru [a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	patient did not follow through	11	15.5	17.7	17.7
	patient followed through or rescheduled	51	71.8	82.3	100.0
	Total	62	87.3	100.0	
Missing	System	9	12.7		
Total		71	100.0		

a. quarter = Apr 2012 - Jun 2012

Fol-thru [a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	patient did not follow through	3	4.3	4.4	4.4
	patient followed through or rescheduled	65	94.2	95.6	100.0
	Total	68	98.6	100.0	
Missing	System	1	1.4		
Total		69	100.0		

a. quarter = Jul 2012 - Sept 2012

Fol-thru [a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	patient did not follow through	3	2.2	2.3	2.3
	patient followed through or rescheduled	130	95.6	97.7	100.0
	Total	133	97.8	100.0	
Missing	System	3	2.2		
Total		136	100.0		

a. quarter = Oct 2012 - Dec 2012

Fol-thru [a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	patient did not follow through	3	1.4	1.4	1.4
	patient followed through or rescheduled	205	96.2	98.6	100.0
	Total	208	97.7	100.0	
Missing	System	5	2.3		
Total		213	100.0		

a. quarter = Jan 2013 - Mar 2013

4. Referral Follow-throughs Broken Down by County and Quarter

Fol-thru * county Crosstabulation[a]

Count

		county					Total
		Oldham	Trimble	Henry	Carroll	Jefferson	
Fol-thru	patient did not follow through	1	3	0	0	0	4
	patient followed through or rescheduled	18	5	6	4	1	34
Total		19	8	6	4	1	38

a. quarter = Jan 2012 -Mar 2012

Fol-thru * county Crosstabulation[a]

Count

		county				Total
		Oldham	Trimble	Henry	Carroll	
Fol-thru	patient did not follow through	9	0	2	0	11
	patient followed through or rescheduled	26	11	6	5	48
Total		35	11	8	5	59

a. quarter = Apr 2012 - Jun 2012

Fol-thru * county Crosstabulation[a]

Count

		county					Total
		Oldham	Trimble	Henry	Carroll	Owen	
Fol-thru	patient did not follow through	3	0	0	0	0	3
	patient followed through or rescheduled	37	6	10	5	1	59
Total		40	6	10	5	1	62

a. quarter = Jul 2012 - Sept 2012

Fol-thru * county Crosstabulation[a]

Count

		county					Total
		Oldham	Trimble	Henry	Carroll	Jefferson	
Fol-thru	patient did not follow through	1	0	2	0	0	3
	patient followed through or rescheduled	77	20	17	4	5	123
Total		78	20	19	4	5	126

a. quarter = Oct 2012 - Dec 2012

Fol-thru * county Crosstabulation[a]

Count

		county					Total
		Oldham	Trimble	Henry	Carroll	Jefferson	
Fol-thru	patient did not follow through	3	0	0	0	0	3
	patient followed through or rescheduled	120	19	36	14	3	192
Total		123	19	36	14	3	195

a. quarter = Jan 2013 - Mar 2013

5. Summary Tables

Table 1. Referrals by County

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham	321	57.1	61.4	61.4
	Trimble	66	11.7	12.6	74.0
	Henry	90	16.0	17.2	91.2
	Carroll	35	6.2	6.7	97.9
	Jefferson	10	1.8	1.9	99.8
	Owen	1	.2	.2	100.0
	Total	523	93.1	100.0	
Missing*	System	39	6.9		
Total		562	100.0		

* Missed recording county of patient on referral

Table 2. Referrals by Quarter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Jan 2012 -Mar 2012	71	12.6	12.7	12.7
	Apr 2012 - Jun 2012	71	12.6	12.7	25.4
	Jul 2012 - Sept 2012	69	12.3	12.3	37.7
	Oct 2012 - Dec 2012	136	24.2	24.3	62.0
	Jan 2013 - Mar 2013	213	37.9	38.0	100.0
	Total	560	99.6	100.0	
Missing	System	2	.4		
Total		562	100.0		

Table 3. Referrals by Provider Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oldham Co Health Dept	68	12.1	12.9	12.9
	UK clinics	200	35.6	37.9	50.8
	local network specialist	123	21.9	23.3	74.1
	*hospital test	92	16.4	17.4	91.5
	advocate	3	.5	.6	92.0
	*BHNE clinic	20	3.6	3.8	95.8
	UofL	3	.5	.6	96.4
	Baptist Medical Associates	1	.2	.2	96.6
	*Baptist East	1	.2	.2	96.8
	Mercy	12	2.1	2.3	99.1
	Blue Surgery Clinic	1	.2	.2	99.2
	social services	1	.2	.2	99.4
	**PHHC – same as HHC	1	.2	.2	99.6
	**HHC	2	.4	.4	100.0
	Total	528	94.0	100.0	
Missing	System	34	6.0		
Total		562	100.0		

* These three providers are the same referral site: hospital test, BHNE clinic, and Baptist East.

** HHC (Hope Health Clinic) is a referral for mental health counselors who do not work at the clinic but use the clinic offices to see patients on site.

Appendix C. Referral Specialties and Other Network Categories, 2011-14

Medical Specialists

Adolescent medicine specialist	Neurological surgeon
Allergist (immunologist)	Neurologist
Anesthesiologist	Nuclear medicine specialist
Cardiac electrophysiologist	Obstetrician
Cardiologist	Occupational medicine specialist
Cardiovascular surgeon	Ophthalmologist
Colon and rectal surgeon	Oral surgeon (maxillofacial surgeon)
Critical care medicine specialist	Orthopedic surgeon
Dermatologist	Otolaryngologist
Developmental pediatrician	Pain management specialist
Diagnostic radiologist	Pathologist
Emergency medicine specialist	Pediatrician
Endocrinologist	Perinatologist
Forensic pathologist	Physiatrist
Gastroenterologist	Plastic surgeon
Geriatric medicine specialist	Preventive medicine specialist
Gynecologic oncologist	Psychiatrist
Gynecologist	Pulmonologist
Hand surgeon	Radiation oncologist
Hematologist	Radiologist
Hepatologist	Reproductive endocrinologist
Hospice and palliative medicine specialist	Rheumatologist
Hospitalist	Sleep disorders specialist
Hyperbaric physician	Spinal cord injury specialist
Infectious disease specialist	Sports medicine specialist
Internist	Surgeon
Interventional cardiologist	Thoracic surgeon
Medical oncologist	Urologist
Neonatologist	Vascular surgeon
Nephrologist	

Behavioral Health	Other Service Providers
Addiction treatment	Dentist
Anger management	Audiologist
Counselor (BH)	Pastoral counseling
Social Worker	
Clinical psychologist	
Therapist	

Appendix D. Patient Survey

Hope Clinic Patient Survey

Instructions – THIS IS AN ANONYMOUS SURVEY – please do NOT place your name on it. If you need assistance with filling out this survey, seek help from a Hope Clinic volunteer.

Demographics

1. County ___ Carroll ___ Henry ___ Oldham ___ Trimble
2. Gender ___ Female ___ Male
3. Age ___ 18-25 ___ 26-35 ___ 36-45 ___ 46-60 ___ over 60
4. Education ___ Didn't graduate from high school
   ___ High school graduate
   ___ Technical school graduate or certification: _____(give type)
   ___ Some college
   ___ College graduate
5. Employed? ___ Yes ___ No If yes, where? _____
6. Marital Status ___ Single ___ Married ___ Divorced
7. Number of children ___ 0 ___ 1-2 ___ 3-4 ___ 5-6 ___ 7 or more
8. Number of family members living in home _____
9. Primary language spoken in home _____

Hope Clinic Services: Which of the following services have you used and when did you use it? Please indicate your level of satisfaction for each service.

Service	Date of Service	Not Helpful	Just OK	Changed My Life for the Better	Other reaction: Please describe
10. Medical service at the clinic					
11. Lab procedures					
12. Dental care					
13. Diabetes management					
14. Weight loss help					
15. High blood pressure management					
16. Smoking cessation					
17. Financial counseling or service					
18. Job assistance					
19. Job training					

Service	Date of Service	Not Helpful	Just OK	Changed My Life for the Better	Other reaction: Please describe
20. Housing assistance					
21. Food assistance					
22. Child care assistance					
23. Spiritual counseling					
24. Marriage counseling					
25. Exercise class(es)					
26. Nutrition class(es)					
27. Emotional or mental assistance					
28. Other: _____					
29. Other: _____					

30. What service or assistance is missing from Hope Clinic's whole-person approach to healthcare?

_____
_____

_____
_____

_____
_____

How has Hope Clinic services increased your awareness of and participation in healthy behaviors?

Healthy Behavior	Think about it less often	Think about it more often	Actively participate	Tell family or friends about it	Get family or friends involved	Does not apply
31. Get healthy check-up						
32. Get needed healthcare						
33. Take care of my teeth						
34. Stop smoking						
35. Check blood pressure						

Healthy Behavior	Think about it less often	Think about it more often	Actively participate	Tell family or friends about it	Get family or friends involved	Does not apply
36. Healthy weight						
37. Daily physical activity – moderate or vigorous						
38. Eat healthy foods						
39. Sleep well for 6-8 hours						
40. Anger management						
41. Stress management						
42. Enjoy life						

43a. In the last six months, have you not obtained medical treatment due to cost or other barriers?

_____ Yes _____ No

43b. If yes, what was the reason you did not obtain medical treatment? Check all that apply.

___ Cost for doctor's visit

___Cost of medication

___ Too many health problems

___ Dislike of doctors

___ Transportation problem

___ Too far from home

___ Fear of what I would find out

___ Can't get off work

___ Other – please name it:

_____

___ Other – please name it:

_____

44. How has Hope Health Clinic changed the way you get the medical care you need? Check all that apply.

___ It hasn't changed – I still use the emergency room for non –emergencies.

___ I no longer use the emergency room except for emergencies.

___ I still have to be admitted to the hospital to treat my condition, which is _____.

___ I no longer need to be admitted to the hospital.

___ I now have a primary care provider that I see regularly (at the clinic or at another medical office).

___ I go to the doctor when I need to.

___ I take medicines as the doctor prescribes.

___ I take better care of myself now by: _____.

___ Other – please name it:
_____.

___ Other – please name it:
_____.

Thanks so much for your time!

Appendix E. Self-efficacy Form (also provided in Spanish)

Patient Name _____ Date _____

Hope Health Clinic

STANFORD PATIENT EDUCATION RESEARCH CENTER

Patient Ability to Manage Ongoing Illness

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

1. How confident are you that you can keep the fatigue caused by your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

2. How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

3. How confident are you that you can keep the emotional distress caused by your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

4. How confident are you that you can keep any other symptoms or health problems you have from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

5. How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

6. How confident are you that you can do things other than just taking medication to reduce how much your illness affects your everyday life?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

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Funded by the National Institute of Nursing Research (NINR)

Appendix F. Social Network Analysis

Hope Health Clinic Social Network Analysis

Social network analysis was used to examine the Hope Health Clinic (HHC) healthcare provider social network. This analytical technique was used to explore the evolution of the HHC service delivery process, examining the network members and their exchanged resources within the social network.

The exploration will aid in evaluating the community health clinic and its intended network of providers for increasing access to quality healthcare; improving the level of care among low-income and uninsured chronic clients; and reducing the cost of care, especially in the reduction of non-emergency ER services. Information stemming from this data can help make sense of what occurs within service delivery networks as these services are provided. Additionally, the resulting information can be used as a feedback mechanism that not only aids those shaping the network to make more informed decisions, but can also help the evaluation team create new ways of measuring change in the networks. This analysis can better reveal how the network is evolving in ways that are relevant to the delivery of medical and social services.

Social Network Analysis Research

Researchers define social networks as collections of individuals and organizations plus the shared relationships among them (Wasserman & Faust, 1994). Social network analysis employs qualitative and quantitative approaches to understand the collective network, its members, and their shared relationships. This analysis includes the creation of sociograms, or visual depictions of the networks with their members and relationships. Within a sociogram, a single point, or node, represents a network member, and a line drawn between two nodes indicates a relationship between two members. Sociograms display the complete collection of nodes and relationships within the network. Researchers also can create a series of sociograms for different time periods, and these diagrams provide insights into the network's evolution, such as when members joined the network and how they interacted over time (de Nooy, Mryar, & Batageli, 2005).

Sociograms and an evaluation of network relationships can help identify key providers. Members with numerous relationships have greater access to information and other resources, and often reside at or near the network's center. Conversely, members with less influence have fewer relationships and often congregate along the network's outskirts (de Nooy et al., 2005). Thus, healthcare providers located at the network's center would likely have more shared relationships and serve as network hubs within the network, disseminating information and resources to other providers and clients.

Researchers have used SNA in diverse areas such as educational reform (Kochan & Teddlie, 2006), sport communication (Hambrick, 2012; Hambrick & Sanderson, 2013), and governmental service delivery (Fredericks, 2006). The studies revealed the advantages of examining network members and their relationships as well as understanding how their interactions can combine to improve the network. For example, Fredericks (2006) studied a government agency's programs and quality of service delivery. Sociograms were used to track the flow of information and services among various network members, which included other government agencies, non-profit organizations, and service recipients. The sociograms revealed a concentration of network members at the network's center. More centrally located members generated and controlled program-related information and resources, while members on the network's boundaries were left wanting. The researcher concluded the social network limited the spread of new ideas and information and hampered the program's effectiveness in providing services to its clients (Fredericks, 2006). These same evaluation techniques can be used within a health care delivery context to understand key network members and relationship and how the network has evolved over time.

The social network data and sociograms can offer more insights into the service delivery network's structure and reveal opportunities to increase its efficiency and resource flow.

Research Purpose and Questions

The purpose of this study was to evaluate whether the holistic-based HHC, using a medical home model and navigation system, improved health outcomes and reduced healthcare costs for low-income, uninsured residents in its four-county service area. The study addressed the following research questions:

> RQ1: How does a medical service network expand from an initial baseline state?
> RQ2: How do patients with different needs and characteristics flow through a medical service network?
> RQ3: How do different subgroups (e.g., cancer versus diabetic patients) flow through the network, and how can network density help service providers understand the network?

The study used social network analysis to measure the development of and outcomes associated with HHC healthcare delivery. HHC, with its collection of healthcare delivery providers, clinic staff, volunteers, and patients, represents a social network, and social network analysis was used to examine the network in multiple ways: identifying (a) which members existed within the network, (b) what relationships connected members together, (c) what resources were exchanged through these relationships, and (d) how the resource exchanges evolved over time.

Social network analysis was used to gain a better understanding of the healthcare provider network and its resource exchanges, as the analytical technique was used to explore the clinic and its network members in more detail.

Method

Data were collected from the HHC's Health Navigator patient referral logs, which provide information about the health services providers used and services obtained. The patient referral logs spanned two time periods: (a) Period 1 occurred from Quarter 1 (January-March) 2012 to Quarter 1 (January-March) 2013, and (b) Period 2 occurred from Quarter 2 (April-June) 2013 to Quarter 3 (July-September) 2014.

Social network analysis software Gephi was used to analyze the data. The software can help explore a network's members and relationships as well as the diffusion process with the spread of services and other innovations within the network (Gephi, 2014). Researchers can also use the software to create visual depictions of and quantitative details about the network (Batagelj & Mrvar, 2010).

This study included three steps: (a) classifying network members into two categories (healthcare providers and clients); (b) creating sociograms to display the social network, its members, and their relationships; and (c) using qualitative and quantitative analysis to describe the network. Sociograms were used to display network members and their individual relationships, and offered insight into the network's structure with its members and their levels of connection to one another. The sociograms were constructed at various points in time--across 11 three-month periods from Quarter 1 2012 to Quarter 3 2014--to explore the development and evolution of the networks over time (de Nooy, Mrvar, & Batagelj, 2005).

In addition to sociograms, social network analysis software can provide quantitative details about the social networks. This data gives information about the number of members joining the network, what relationships develop among them, and how they use relationships to share resources and provide services. This can be quantified via network density, or the ratio between the actual number of relationships within the network versus the maximum number of possible relationships within the network. Density values range from zero to one, where .000 indicates no relationships among network

members and 1.000 reveals all members share direct connections to one another. Higher density values indicate information and resources can flow more quickly and efficiently through the network, while lower values indicate a slower and less efficient flow of resources (de Nooy et al., 2005). In this study, density values along with the number of nodes and relationships were examined to track the evolution of the HHC social network over time.

Results

The purpose of this study was to evaluate whether the holistic-based HHC, using a medical home model and navigation system, improved health outcomes and reduced healthcare costs for low-income, uninsured residents in its four-county service area. Social network analysis quantitative data and sociograms were used to address the three research questions.

RQ1: How does a medical service network expand from an initial baseline state?

The following quantitative data and sociograms provide details about the social network as it evolved over time.

Period 1 - Quarter 1 2012 - Quarter 1 2013

As a baseline state, the first quarter of 2012 reveals the social network contained 80 members with six provider categories: (a) BHNE Clinic, (b) HD, (c) Local Network Specialist, (d) UK Clinic, (e) UofL, and (f) Other (Table 1). Individual providers were categorized into one of six groups and depicted a parsimonious view of the data with interaction among clients and providers across the social network. These members shared 71 relationships, and each relationship was defined as a single interaction between a client and a network provider. Some clients met with the same provider more than one time during the quarter, and each interaction was recorded as a single relationship.

The number of network members decreased to 75 in the second quarter of 2012, and the network members shared 71 relationships. The number of network members increased to 77 in the third quarter of 2012, and the network members shared 69 relationships. The number of network members increased further in the fourth quarter of 2012 with 111 clients, and the network members shared 136 relationships. Finally, the number of network members increased again in the first quarter of 2013 with 140 clients, and the network members shared 213 relationships.

The data provide evidence of the HHC provider network expansion over time as the number of new and existing clients used services across the network. Looking at the data by provider type reveals that the Local Network Specialist and UK Clinic offered the most services over the five quarters. The Local Network Specialist providers grew from 20 relationships in the first quarter of 2012 to 35 relationships in the first quarter of 2013. The UK Clinic increased its relationships from 26 in the first quarter of 2012 to 63 relationships in the first quarter of 2013. The BHNE Clinic also witnessed a sizeable increase in services, growing from one relationship in the first quarter of 2012 to 69 in the first quarter of 2013.

Next, sociograms were used to display the network relationships visually among the clients and their individual relationships with network providers. To protect the privacy of clients, each individual was given a random identification number, as this would allow clients to be depicted in the social network without revealing their identities. Each client and network provider was displayed as a node, or circle, and the lines connecting two nodes represented the shared relationship between the client and the provider. The series of sociograms shows the evolution of the network over time.

Table 1. HHC social network attributes

Quarter	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013	Q3 2013	Q4 2013	Q1 2014	Q2 2014	Q3 2014
Network Attributes											
Members	80	75	77	111	140	156	87	69	72	50	35
Relationships	71	71	69	136	213	262	130	102	93	56	35
Density	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03
Providers											
BHNE Clinic	1	11	2	31	69	96	36	44	25	22	10
HD	18	3	0	25	22	10	10	6	18	8	8
Local Specialist	20	28	19	21	35	64	36	21	31	19	13
UK Clinic	26	24	44	42	63	18	6	3	7	2	0
UofL	1	1	0	0	1	74	41	28	12	5	4
Other	5	4	4	17	23	0	1	0	0	0	0
Total	71	71	69	136	213	262	130	102	93	56	35

Figure 1. HHC network relationships by quarter and cumulatively

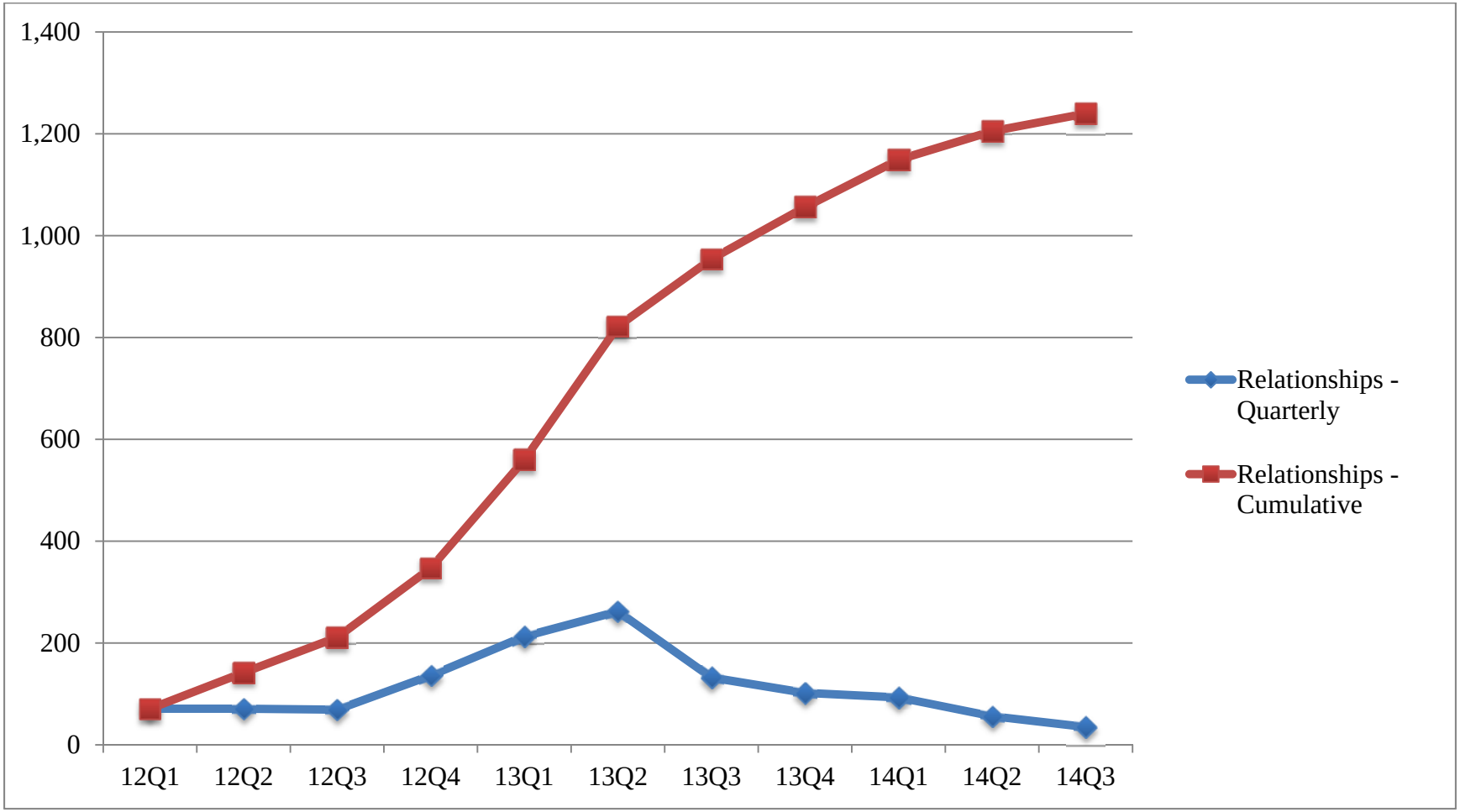
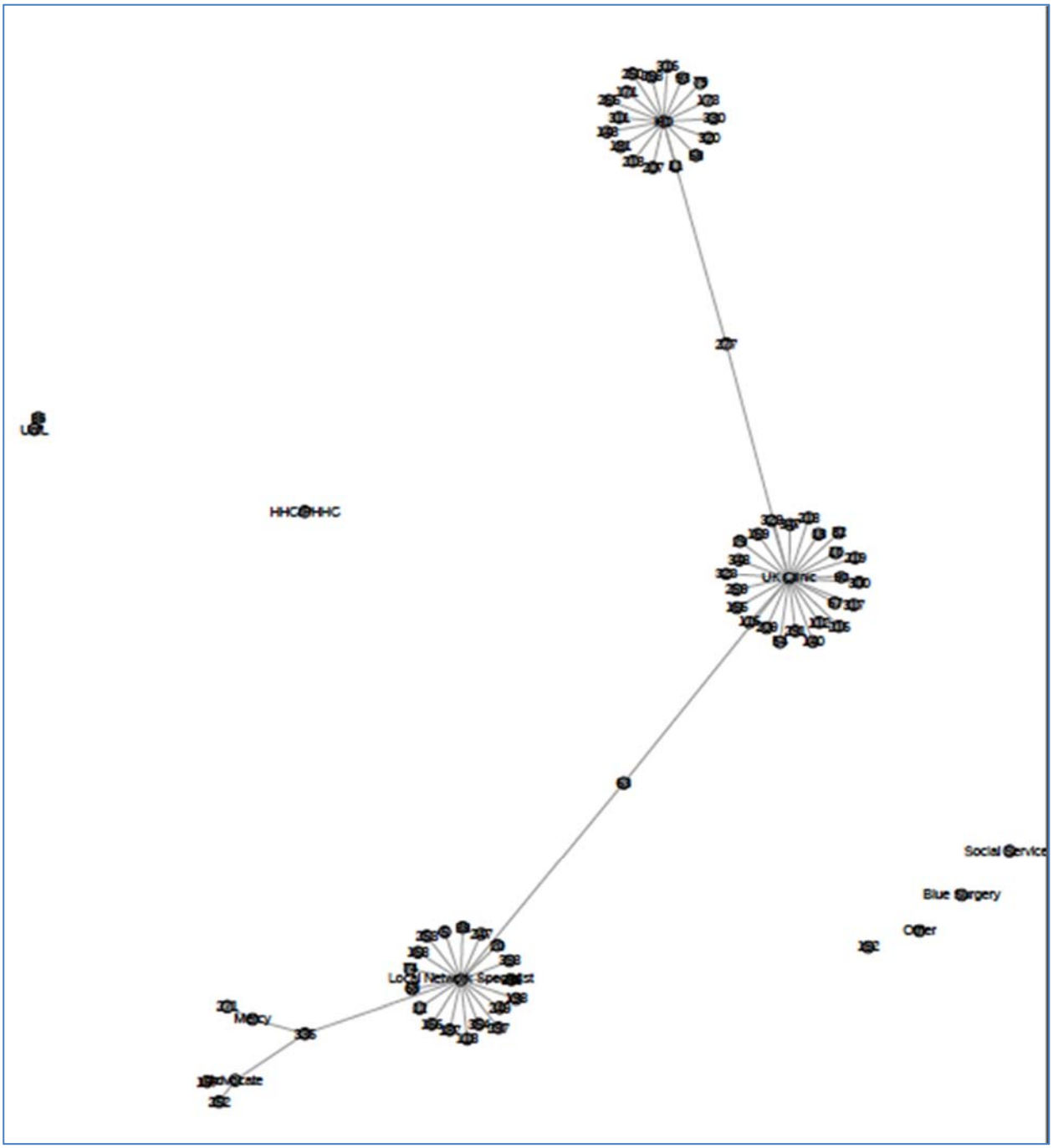


Figure 2. HHC social network in Quarter 1 2012

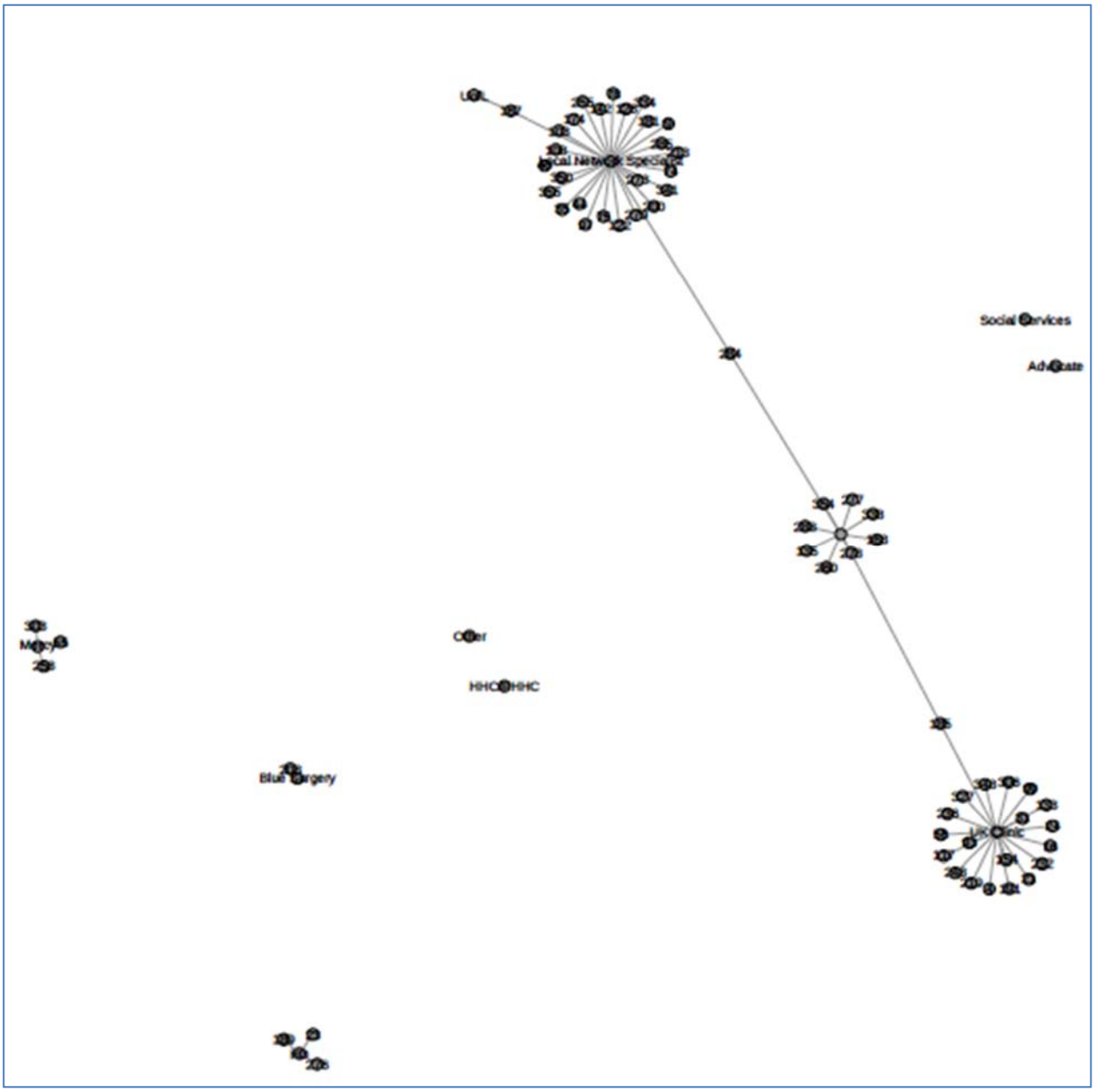


Similar patterns were found across the five sociograms during the first period. The pattern most evident was the star pattern, where the network provider was located at the center of a circular figure with clients attached to the provider. The UK Clinic provided services to 26 clients, and the clinic was shown at the nexus with the clients radiating outward in the star pattern. A similar pattern was revealed with HD and the Local Network Specialists. The other providers with fewer clients had less distinct star patterns. Some provided no services during this time period, and were bunched together in the figure above. Additionally, some clients used more than one service during the quarter, and linked two or more providers together. These linkages can help increase the density of the network as more network members share multiple providers and services.

The density value for this sociogram was .011, which indicated that approximately 1% of the possible relationships among network members were captured within the network. While the number is small, density values may be smaller in a newly

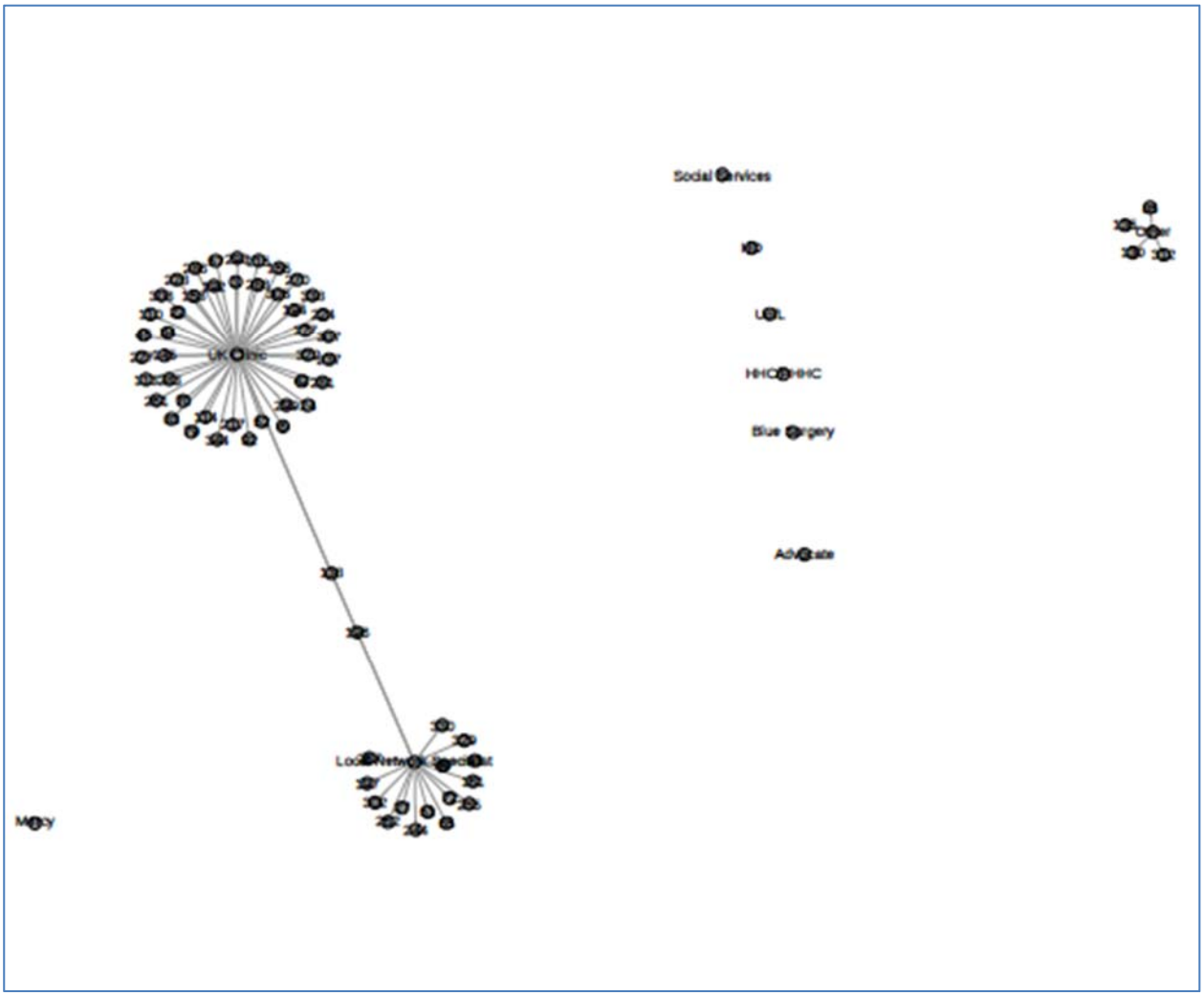
formed network where individuals and organizations first join together. As existing clients learn about and use additional services, the network density could increase. Having said that, the addition of new clients and/or service provider groups without a corresponding increase in additional relationships could cause the network density to drop, as evidenced in some of the following sociograms.

Figure 3. HHC social network in Quarter 2 2012



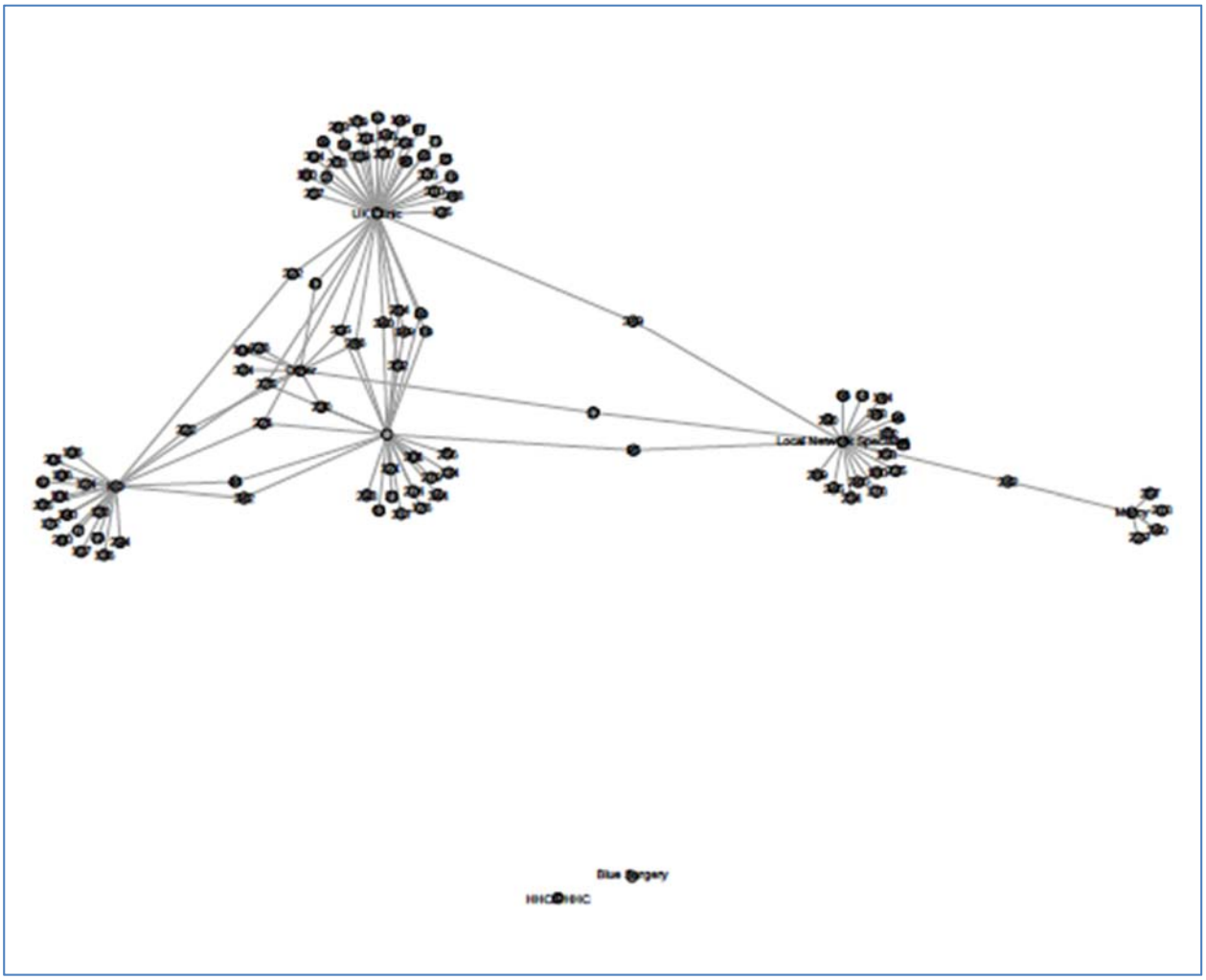
Moving from quarter one to quarter two revealed similar patterns, with distinct star patterns for the Local Network Specialists and UK Clinic. HD provided fewer services but remained part of the network. In this quarter, BHNE Clinic increased the number of relationships and also linked to UK Clinic via its clients. The number of network members decreased, while the number of relationships stayed the same, thereby maintaining the overall integrity of the network. The density value for this sociogram was .012, which indicates that approximately 1% of the possible relationships among network members were captured within the network.

Figure 4. HHC social network in Quarter 3 2012



The third quarter sociogram reveals a different pattern from the first two quarters. The UK Clinic assumed a larger role within the network and offered more services, as depicted via its distinct star pattern. The UK Clinic's provision of services surpassed the Local Network Specialists, which also displayed a star pattern. Two clients linked the two providers together, while fewer clients utilized the other provider services during this time period. The density value for this sociogram was .011, which indicates that approximately 1% of the possible relationships among network members were captured within the network.

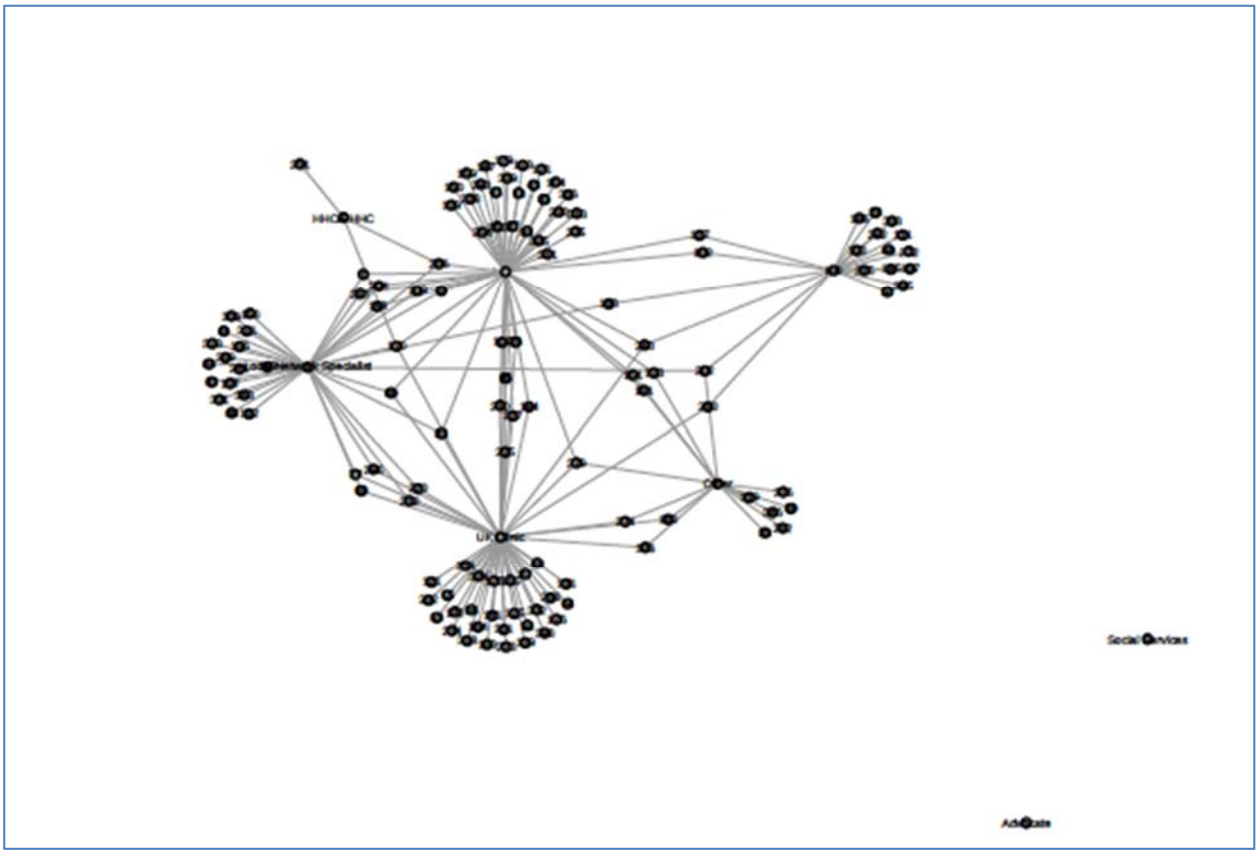
Figure 5. HHC social network in Quarter 4 2012



Moving into the fourth quarter of 2012, the sociogram revealed a cohesive network as more clients used multiple services and more providers connected to one another via these shared relationships. UK Clinic and Local Network Specialists continued to play an integral role, but other providers offered more services to multiple clients across the network. This sociogram suggests clients took advantage of a variety of services and providers in turn leveraged one another to provide a cohesive package of services to interested parties.

The density value for this sociogram was .010, which indicates that approximately 1% of the possible relationships among network members were captured within the network. As mentioned above, while the sociogram appeared more connected, an increase in the number of network members--and the potential for additional relationships--caused the density value to decrease.

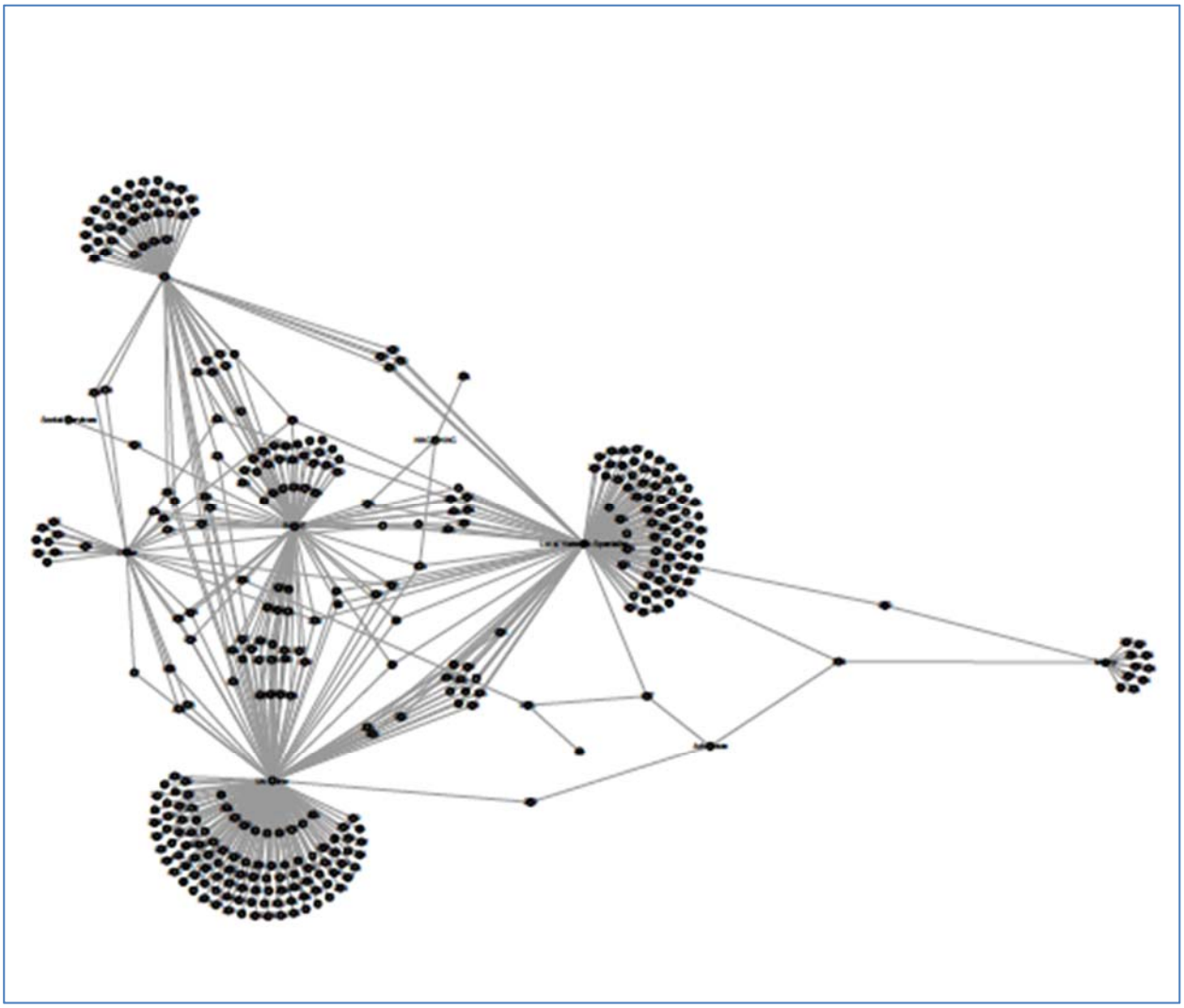
Figure 6. HHC social network in Quarter 1 2013



Finally, the first quarter of 2013 revealed an even greater level of cohesiveness across the network with the largest number of network members and relationships to date. This network evolution again provides evidence of the network provider activity and the willingness of clients to take advantage of these services. Assuming this pattern of growth continues, one would expect to see a further increase in the number of network members and relationships as well as a greater level of cohesiveness across the network.

The density value for this sociogram was .009, which indicates that approximately 1% of the possible relationships among network members were captured within the network. An inverse relationship exists with the latest sociograms, where increases in network members and relationships lead to decreases in density value. While the sociograms appear more connected with more providers and relationships, an increase in the number of network members--and the potential for additional relationships--caused the density values to decrease.

Figure 7. HHC social network for Period 1



Overall, Period 2 from Quarter 1 2012 to Quarter 1 2013 demonstrated cohesiveness across the network with a sizeable number of network members and relationships. The network evolved over these first five quarters, resulting in multiple interactions among the providers and clients. The continued network growth highlights the potential benefits of bringing together network providers to offer a myriad services to potential clients. Collaborations occurred among Local Network Specialists with the UK Clinic and BHNE Clinic, as clients sought an array of services from these providers.

The density value for this sociogram was .003, which indicates that less than 1% of the possible relationships among network members were captured in the network. Similar to the findings in the Quarter 1 2013, the sociogram reflects a connected network of providers, clients, and relationships among them. However, the network as a whole grew, and reflects the desired strategic outcomes of the HHC stakeholders.

Period 2 - Quarter 2 2013 - Quarter 3 2014

Moving into the second period, data were examined from the second quarter of 2013 to the third quarter of 2014. As a baseline state, the second quarter of 2013 revealed the social network contained 156 members with six provider categories: (a) BHNE Clinic, (b) HD, (c) Local Network Specialist, (d) UK Clinic, (e) UofL, and (f) Other. These members shared 262 relationships, again defined as a single interaction between a client and a network provider.

The number of network members decreased to 87 in the third quarter of 2013, and the network members shared 130 relationships. The number of network members decreased to 69 in the fourth quarter of 2013, and the network members

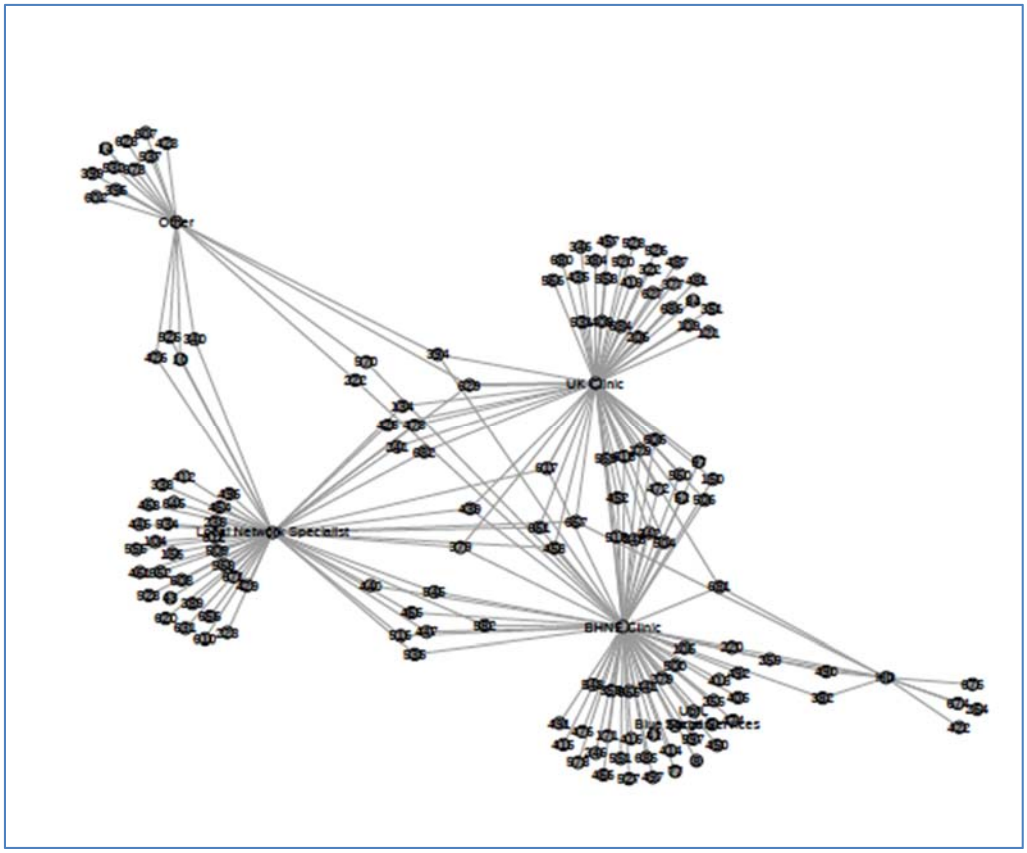
shared 102 relationships. Moving into 2014, the number of network members increased to 72 with 93 relationships during the first quarter. The number of network members decreased to 50 in the second quarter, and the network members shared 56 relationships. Finally, in the third quarter, the number of network members decreased, resulting in 35 network members and 35 shared relationships.

In comparison to the previous period, the data from the current period outlines the HHC provider network's contraction across the quarter as a more limited number of individuals took part in the network's services in comparison to the previous quarters. The network's growth peaked in the second quarter of 2013, attaining the largest number of individuals and relationships over Periods 1 and 2. However, the number of members and relationships within each quarter declined as the year progressed, and this tapering off continued into 2014.

The largest declines occurred with the BHNE Clinic, Local Network Specialists, and UofL. The BHNE Clinic relationships dropped from 96 in the second quarter of 2013 to 10 in the third quarter of 2014. The Local Network Specialist provider relationships fell from 64 to 13 during the same time period. Likewise, the UofL relationships were reduced from 74 to 4 across the period. However, the overall structure of the network remained as those within the network continued to provide and use a variety of services.

Similar to the previous period, sociograms were used in Period 2 to display the network relationships occurring within each quarter, and this visual depiction included the clients and their individual relationships with network providers. Clients were given a random identification number, which would allow individuals to be depicted in the social network without revealing their respective identities. Each client and network provider was displayed as a node, or circle, and the lines connecting two nodes represented the shared relationship between the client and the provider. The series of sociograms shows the evolution of the network over Period 2.

Figure 8. HHC social network in Q2 2013

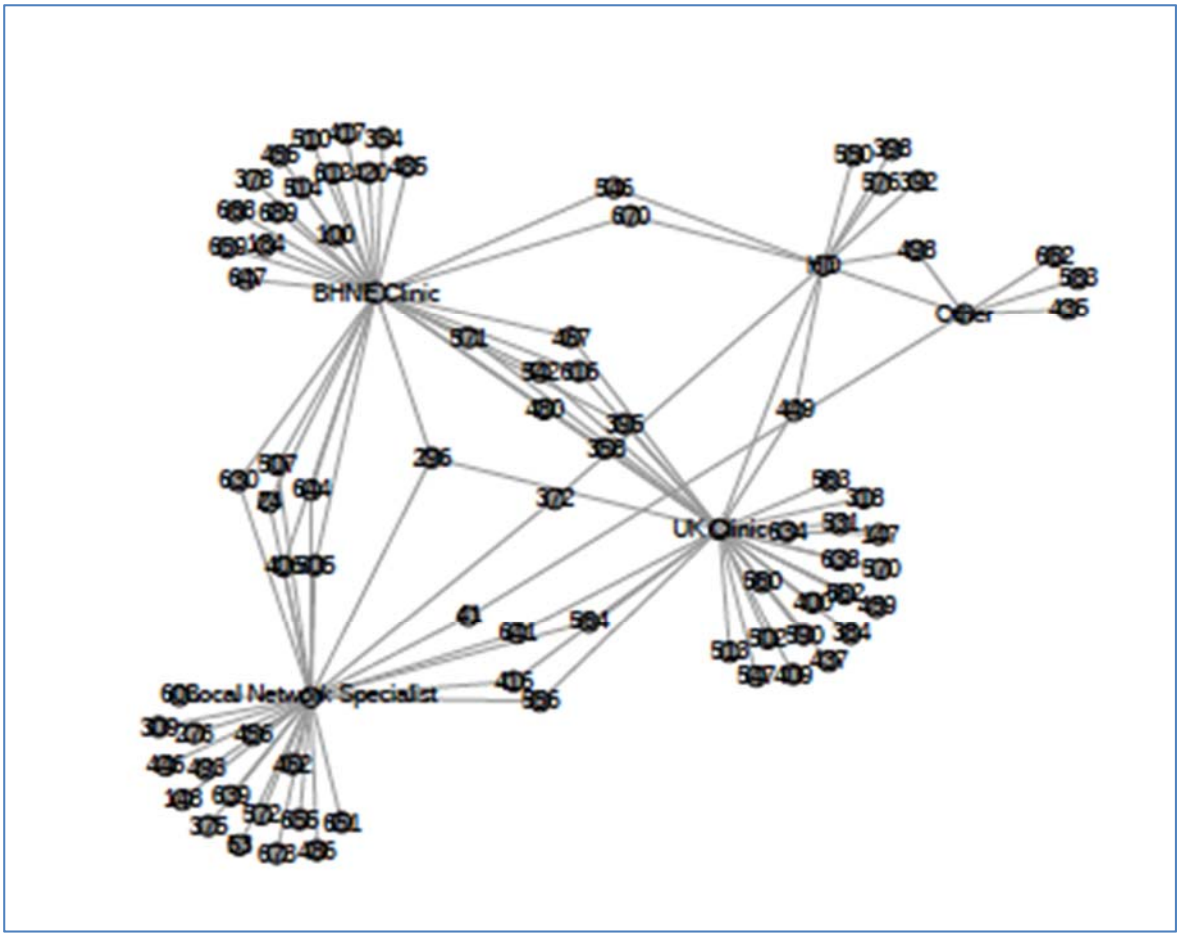


Similar to the prior quarter, the second quarter of 2013 showed cohesiveness with the addition of the largest number of network members and relationships across the eleven quarters examined. This result points to the growing number of

healthcare organizations and individuals taking part in the service delivery process. A growing number of clients connected the different providers together, particularly the triad of the BHNE Clinic, UK Clinic, and Local Network Specialists.

The density value for this sociogram was .008, which indicates that approximately 1% of the possible relationships among network members were captured within the network. Similar to the previous period examined, the sociogram appeared more cohesive with more relationships; however, an increase in the number of network members--and the potential for additional relationships--resulted in a relatively small density value.

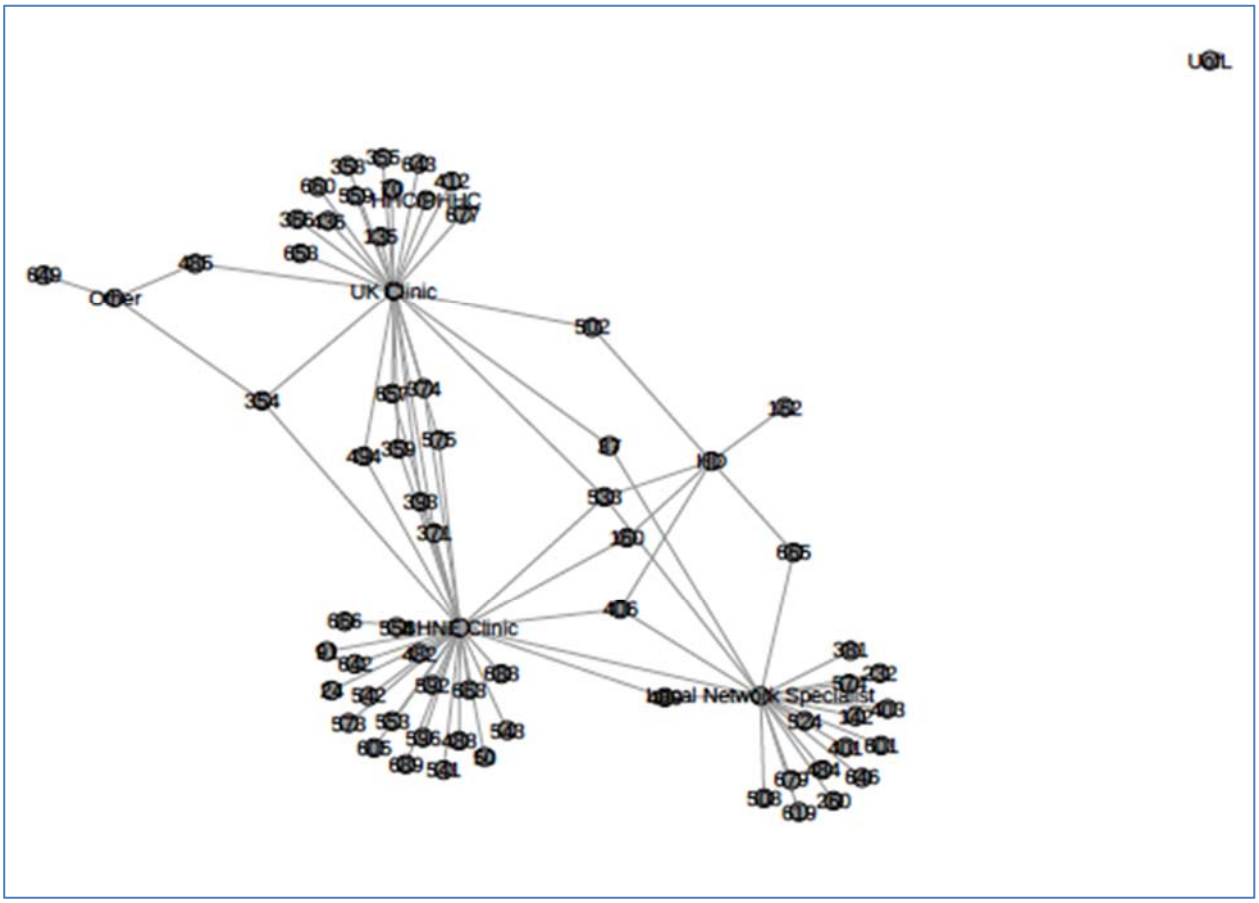
Figure 9. HHC social network in Q3 2013



The third quarter of 2013 continued to demonstrate the network's cohesiveness, as the network structure displayed stability in relation to the previous period. Again, the triad of the BHNE Clinic, UK Clinic, and Local Network Specialists continued to play a pivotal role in the delivery of services. While the number of clients using the services declined in this period, the network's structure still revealed active usage within this group.

The density value for the sociogram was .014, which indicates that approximately 1% of the possible relationships among network members were captured within the network. The density value increased, resulting from the decrease in network relationships occurring in this quarter.

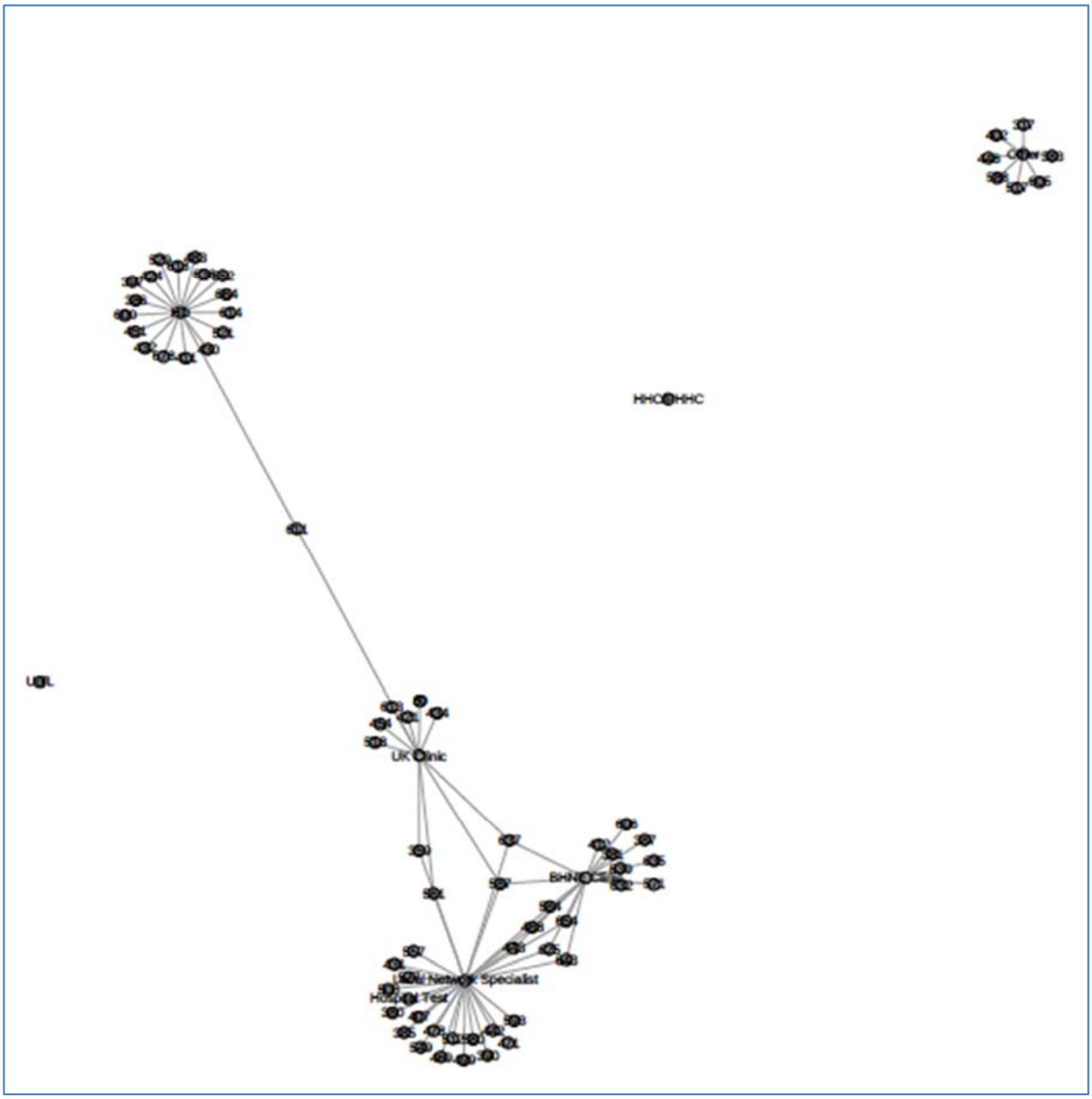
Figure 10. HHC social network in Q4 2013



Moving into the fourth quarter, the number of network members and relationships declined in relation to the previous quarters. However, the network's core structure remained as the BHNE Clinic, UK Clinic, and Local Network Specialists offered most of the services. This existing structure revealed a continuous level of network stability, where users gravitated to these three groups for the bulk of their healthcare needs.

The density value for this sociogram was .018, which indicates that approximately 2% of the possible relationships among network members were captured within the network. The density value increased, resulting from a decrease in network relationships occurring in the fourth quarter.

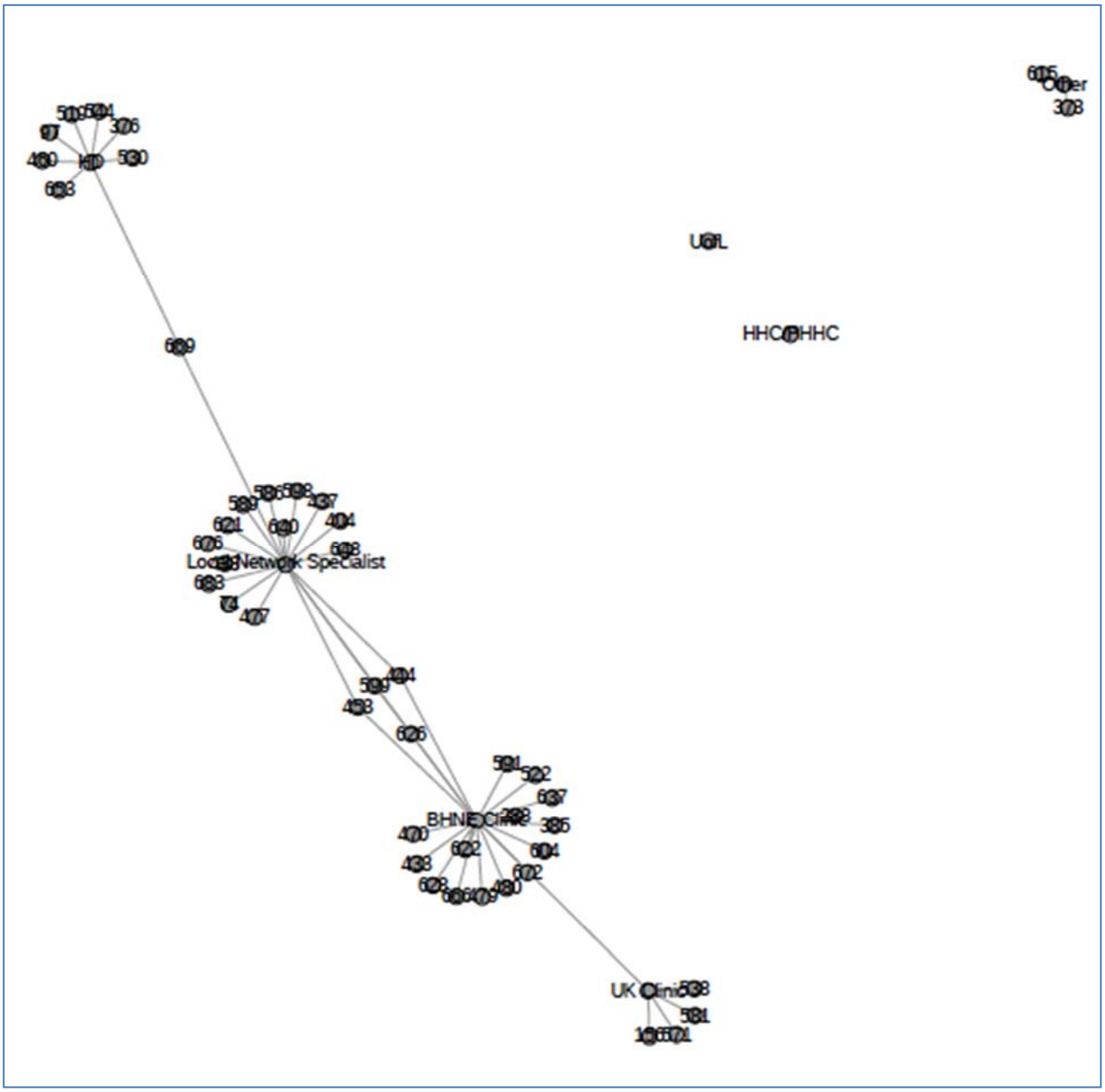
Figure 11. HHC social network in Q1 2014



The first quarter of 2014 presented a network structure that differed from the previous quarters, and shared similarities with the structures found in the first, second, and third quarters of 2012. Here, the network presented the previous star formations, where clients circled around HD, UK Clinic, BHNE Clinic, and the Local Network Specialists. Additionally, some clients used the services of Other providers within the network. A smaller number of members were in this quarter's network; however, the most popular providers found in previous periods remained.

The density value for this sociogram was .016, which indicates that approximately 2% of the possible relationships among network members ere captured within the network. Continuing the trend of the previous quarters, the density value remained similar, reflecting an additional decrease in network relationships occurring in the first quarter.

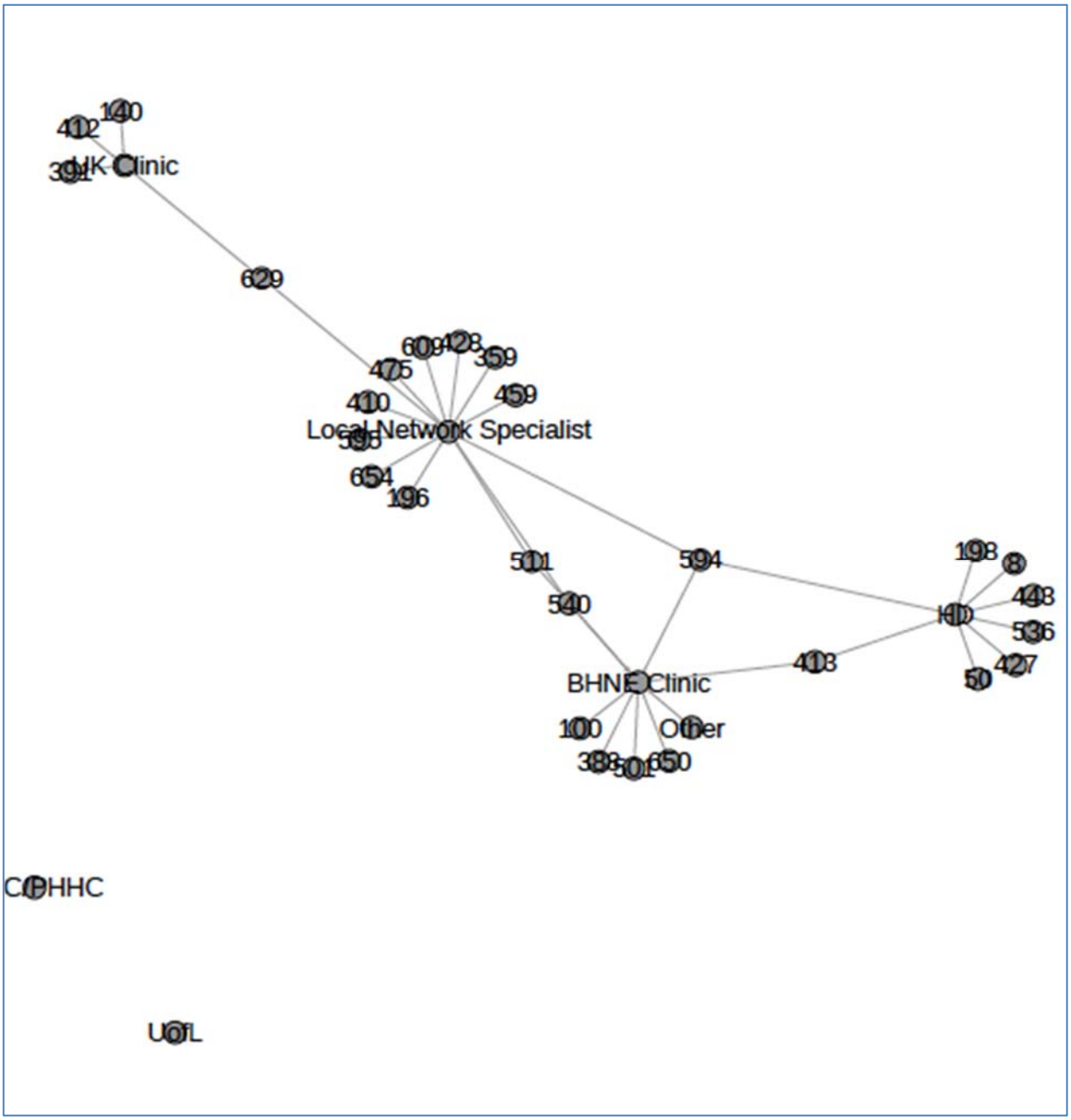
Figure 12. HHC social network in Q2 2014



Again, the second quarter of 2014 reflected the same formation found in the previous quarter, whereby star formations existed around HD, Local Network Specialists, BHNE Clinic, and UK Clinic. The number of network members and relationships decreased, but the network's overall structure remained with the most popular providers continuing to offer their respective services.

The density value for this sociogram is .021, which indicated that approximately 2% of the possible relationships among network members were captured within the network. The density value increased once again, reflecting the additional decrease in network relationships occurring in the second quarter.

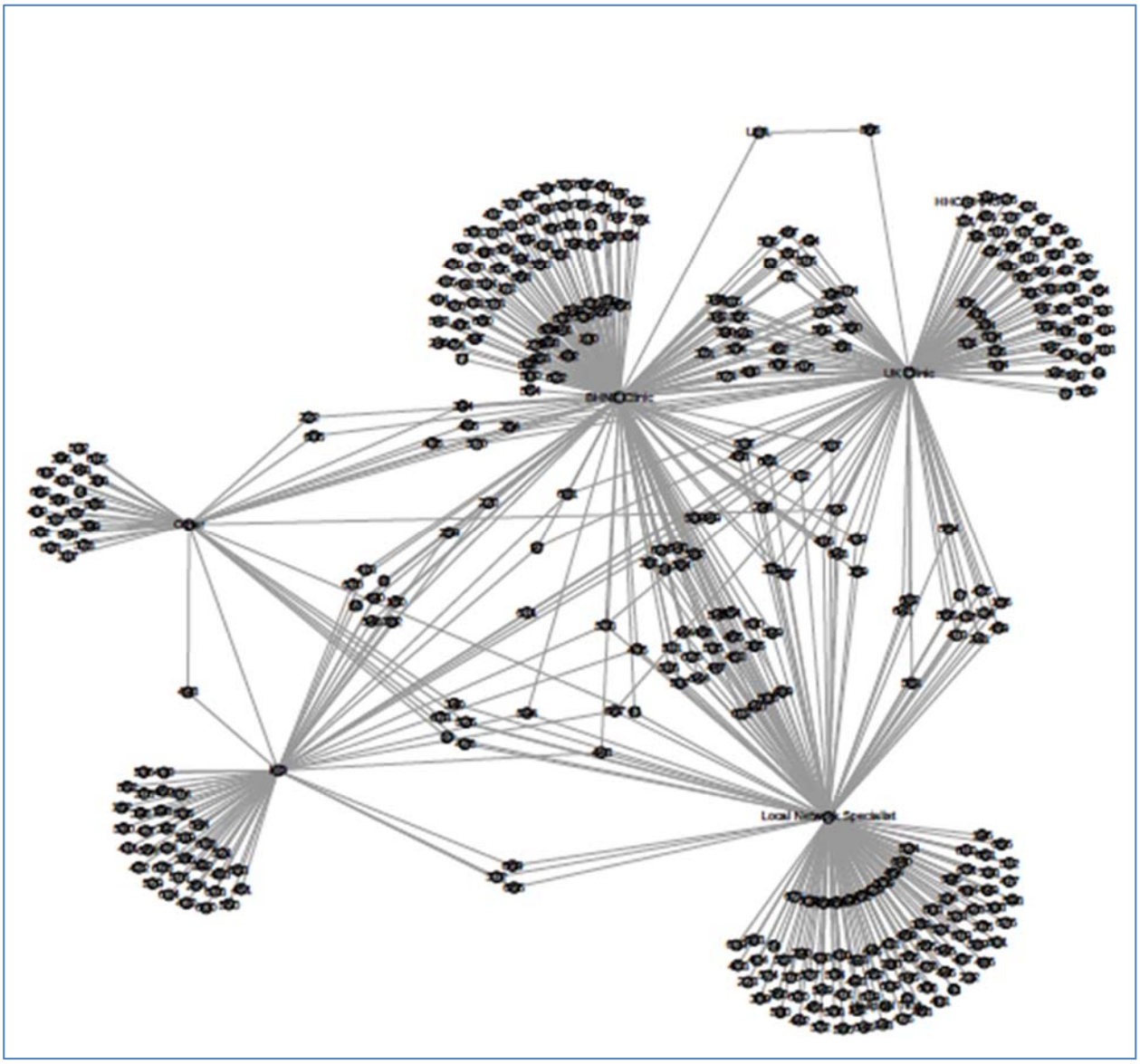
Figure 13. HHC social network in Q3 2014



The last examined quarter revealed a similar structure to the one found in the previous two quarters. Again, the number of network members and relationships decreased. However, the UK Clinic, BHNE Clinic, Local Network Specialists, and HD provided services to these members.

The density value for this sociogram was .029, which indicates that approximately 3% of the possible relationships among network members were captured within the network. The density value increased an additional time, again reflecting the decrease in network relationships occurring in the third quarter.

Figure 14. HHC social network for Period 2



This final sociogram depicts the entire network at the end of Period 2. Similar to the final sociogram for Period 1, the final network revealed a relatively high level of cohesiveness among the network members and relationships. The number of new patients and relationships tapered off across the individual quarters during this period, yet the network as a whole remained stable and comprehensive. Clients utilized multiple services, particularly among the Local Network Specialists, BHNE Clinic, and UK Clinic. Additionally, HD and Other providers played roles in the service delivery process and remained connected to the other groups via their clients. The sociogram highlights that clients continued to take advantage of the network providers and services. Assuming the growth trends remain the same, one would expect the network structure to exhibit a similar structure going forward.

The density value for this sociogram was .004, which indicates that less than 1% of the possible relationships among network members were captured within the network. Similar to the findings in the previous period, the smaller density value reflected the many members and relationships within the network.

RQ2: How do patients with different needs and characteristics flow through a medical service network?

RQ3: How do different subgroups (e.g., cancer versus diabetic patients) flow through the network, and how can network density help providers understand the network?

At this time, the sociograms and quantitative data provide somewhat limited insights into research questions 2 and 3 as they relate to specific client needs and characteristics as well as how they might be served or flow through this social network. Further data would likely be required here, potentially in the form of interviews or other information to gain better insights into these network characteristics and behaviors. This information would help support the existing sociograms and provide greater depth of analysis, certainly leading to a clearer picture of the network's evolution and resource exchanges over time. The interviews and other data may also provide insights into the network's expansion and contraction from the latter quarters of 2013 into to the early quarters of 2014.

Discussion

Overall, the data provides insights into the HHC social network from a baseline perspective beginning in the first quarter of 2012 and how it continued to evolve over a time period of 11 quarters. The sociograms and quantitative data offer clear evidence of the increase in network members and relationships, which allowed the network to grow over time. Although the number of new members and relationships tapered over time, the network maintained cohesion and stability. The data also provided insights as to which providers--in this case, BHNE Clinic, Local Network Specialists, and UK Clinic--offered the most services to clients within the network. The network's evolution reveals an opportunity for continued growth as more clients enter the network and take advantage of the myriad of services. Additionally, an opportunity exists for providers to collaborate more with one another as they provide a comprehensive menu of services to their clients over time.

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