Provision of Telemedicine Services by Community Health Centers

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Abstract

The objective of this study was to assess the use of telemedicine services at community health centers. A national survey was distributed to all federally qualified health centers to gather data on their use of health information technology, including telemedicine services. Over a third of responding health centers (37%) provided some type of telemedicine service while 63% provided no telemedicine services. A further analysis that employed ANOVA and chi-square tests to assess differences by the provision of telemedicine services (provided no telemedicine services, provided one telemedicine service, and provided two or more telemedicine services) found that the groups differed by Meaningful Use compliance, location, percentage of elderly patients, mid-level provider, medical, and mental health staffing ratios, the percentage of patients with diabetes with good blood sugar control, and state and local funds per patient and per uninsured patient. This article presents the first national estimate of the use of telemedicine services at community health centers. Further study is needed to determine how to address factors, such as reimbursement and provider shortages, that may serve as obstacles to further expansion of telemedicine services use by community health centers.

Keywords: Community Health Centers, Telemedicine, Medically Underserved Area

Introduction

Community health centers (CHCs) are a vital source of care for medically underserved populations. In 2012, 1,198 federally qualified CHCs served over 21.1 million patients and 93 look-alike CHCs served an additional 951,242 patients [1]. The patient population at CHCs is

largely low-income and over one in three patients is uninsured, which illustrates the extent to which CHCs fulfill their statutory requirements to provide comprehensive primary care services to all patients in need, regardless of insurance status, and to charge uninsured patients on an income-based, sliding scale basis.

Data on the use of health information technology (HIT) at community health centers indicates that its use has rapidly expanded in the past few years. While only 26% of surveyed CHCs had an electronic health record (EHR) system in 2006, this had increased to 48% in 2008 and 69% in 2010/2011 [2]. The Bureau of Primary Health Care (BPHC) of the Health Resources and Services Administration (HRSA) began reporting the use of EHR systems at CHCs for the year 2011 in its annual report on data from the Uniform Data System (UDS), to which all federally qualified health centers are required to submit annually data on patients served and services provided as well as financial, staffing, and quality of care data. In 2011, 80% of 1,128 CHCs reported that they had a full or partial EHR system in use and this percentage increased to 90% in 2012 [3].

Increasingly, CHCs have added telemedicine services to the array of HIT services offered, with the objective of reducing inequities in health care access while improving the cost-effectiveness and quality of health care [4]. Telemedicine may incorporate both synchronous and asynchronous clinical consults, remote monitoring, and various forms of mobile communication; what each of these applications has in common is the exchange of clinical information across locations and between multiple providers, or between providers and patients. There is some evidence that telemedicine can increase access to specialist care and decrease referral wait times [5]. Yet obstacles to widespread implementation of telemedicine remain. Research indicates that barriers to the use of telemedicine include reimbursement and licensing issues as well as problems with applying quality of care measures that may require in-person, face-to-face encounters to the practice of telemedicine [6]. The objective of this study was to gather data on the use of telemedicine services at federally qualified health centers and to determine if health center characteristics varied according to the extent of telemedicine services use.

While telemedicine has been in use for more than a decade, most notably by the Department of Defense and in the Veteran's Administration system, there are relatively few studies documenting its application, benefits, or value. The Cochrane Collaboration reviewed seven studies comparing telemedicine with face-to-face patient care and concluded that although no studies reported detrimental effects of telemedicine, neither were the reported benefits unequivocal [7]. A systematic review of patient satisfaction with telemedicine found that although all the studies on the subject had methodological issues, they also were unanimous in finding good levels of patient satisfaction [8]. Two systematic reviews conducted a decade apart, in 2002 and 2012, both assessed the cost-effectiveness of telemedicine and found limited evidence that telemedicine is more cost-effective than practice-based care [9].

CHC-based research provides some evidence that telemedicine can improve health outcomes while providing care with which both patients and providers are satisfied. A comparison of telemedicine-based and practice-based collaborative care at rural CHCs for patients who screened positive for depression found that the telemedicine-based group had significantly better responses to treatment, rates of remission, and reductions in depression severity compared to the practice-based group, although the authors concluded that the significant differences were largely due to better adherence to the collaborative care model in the telemedicine group [10]. A study

on the use of telemedicine in Maine, which has one of the largest state-wide telemedicine systems, reported high patient and provider satisfaction rates at CHCs and savings of providers' time and travel [11].

Methods

The Readiness for Meaningful Use (MU) [12] of Health Information Technology and Patient Centered Medical Home (PCMH) Recognition Survey was conducted from December 2010 to February 2011 by researchers from the Milken Institute School of Public Health at the George Washington University's Department of Health Policy in conjunction with the National Association of Community Health Centers. All federally qualified health centers in the United States were invited to participate. Results from the readiness survey were combined with data from the 2009 Uniform Data System (UDS) and analyzed using ANOVA and chi-squared (X^2) tests to determine which center-level characteristics were associated with the provision of telemedicine services. In the survey, telemedicine was defined as:

the exchange of clinical information from one location to another through electronic audiovisual media to improve patients' health status. The exchange may either be between providers or between provider and patient. This exchange may be rendered by using audio-visual technology such as webinars or video-conferencing that is interactive in real time (synchronous) or by transmission of clinical information using technology such as email with document and image transfer that is not real-time interactive (asynchronous), i.e. send a message or question and wait for a response.

Results

Of the 714 health centers that completed the readiness survey, 625 health centers answered questions on the provision of telemedicine services (the results for those who responded that they were "not sure" whether telemedicine was offered were not included in the total number of 625). Of those 625 health centers, 396 (63%) provided no telemedicine services, while 229 (37%) provided some type of telemedicine services. This included 147 CHCs that provided one service and 82 that offered two or more services. Table 1 shows the distribution of telemedicine services provided by type of service. The most commonly offered telemedicine service was "consults offsite providers without patients present" (16% of all respondents and 43% of all centers offering some telemedicine) and the least common was "receives information from home monitoring" (4% of respondents and 11% of those offering telemedicine services).

Table 2 presents the results of ANOVA and X^2 tests for differences between CHCs that offered no telemedicine services with those that provided at least one telemedicine service and with health centers that provided two or more telemedicine services with respect to the use of health information technology (HIT), health center location and patient population, and quality variables. A review of significant findings follows.

Meaningful Use Compliance

In 2011, CMS began to offer incentives through the Medicaid program to health care practices that demonstrated that their providers had achieved "meaningful use" (MU) of HIT. To qualify for these incentives, providers must comply with a series of defined functional objectives and quality measures, including 15 Core Functional measures and 10 additional "menu set"

measures. For Stage 1, these measures focus on the electronic capture of patient information in a standardized format, data tracking, and initiating communication. Centers that provided two or more telemedicine services were more likely to have met core-MU and menu-MU requirements and to have achieved Stage 1 MU compliance at the time of the survey.

Table 1: Number and percentage of health centers offering each telemedicine service

	Health Care Services Other Locations	Consults Offsite Providers with Patients Present	Consults Offsite Providers without Patients Present	Receives information from home monitoring	Mobile health communication via mobile devices	Other telemedicine services
Number	65	93	99	25	36	41
Percent (of 625 total responses)	10%	15%	16%	4%	6%	7%
Percent (of 229 CHCs that offer telemedicine services)	28%	41%	43%	11%	16%	18%

Location

Health centers that provide no telemedicine services were more likely to serve urban communities while CHCs that provided two or more services were significantly more likely to serve rural areas. The survey found that among CHCs that provided two or more telemedicine services, a higher proportion was located in rural communities (55%), while 28% percent was located in urban communities and 17% served both urban and rural areas. Conversely, health centers that offered no telemedicine services were more likely to be located in urban areas (47%), while 34.9% were situated in rural areas and 18.2% in both urban and rural settings.

Health Center Population Characteristics and Staffing

CHCs that provided two or more telemedicine services had a higher percentage of elderly patients (8.7% compared to 7.1% for CHCs that provided no telemedicine services). Health centers that offered two or more telemedicine services also had higher staffing ratios based on full-time equivalent (FTE) staff per 10,000 patients for mid-level providers, such as physician assistants or nurse practitioners (5.2 FTEs per 10,000 patients), and medical personnel[1] (25.9 per 10,000 patients), while CHCs that offered one telemedicine service had the highest ratio of mental health providers (2.6 per 10,000 patients).

Quality Measures

Analysis of seven key quality of care measures reported in the UDS related to diabetes management, control of hypertension, childhood immunization rates, cervical cancer screening, birth weight, and trimester of entry into prenatal care, found a significant difference only with

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[1] This designation includes physicians, mid-level providers, nurses, laboratory personnel, X-ray personnel, and other medical personnel.

respect to "percentage of diabetic patients with HbA1c levels less than 7%" (a measure of good control of diabetes), with centers with one telemedicine service reporting the highest percentage (42.2%).

Funding Variables

The health centers differed significantly with respect to funding characteristics, with CHCs that offered two or more telemedicine services receiving substantially higher state and local funds per patient and per uninsured patient than those centers that provided no telemedicine services and centers that provide only one telemedicine service.

Table 2: Comparison of selected indicators by health centers' provision of telemedicine services

Variables	Provided no telemedicine services	Provided one telemedicine service	Provided two or more telemedicine services	ANOVA or X^2 significance
Distribution (n)	396	147	82	
Distribution (% out of 625)	63.4%	23.5%	13.1%	
Meaningful Use (MU) compliance				
Core MU compliance now	10.5%	10.2%	23.2%	**0.005**
Menu MU compliance now	25.4%	23.8%	40.2%	**0.014**
Stage 1 MU compliance now	6.2%	4.1%	14.6%	**0.007**
EHR operation				
Full	45.6%	42.2%	51.2%	0.650
Partial	23.6%	23.8%	23.2%	
None	30.8%	34.0%	25.6%	
Duration of EHR operation				
Less than a year ago	30.7%	28.9%	30.0%	0.419
1-2 years ago	30.0%	38.1%	25.0%	
3+ years ago	39.3%	33.0%	45.0%	
Has received PCMH recognition	6.8%	7.5%	2.4%	0.280
Received technical assistance from a REC or sub-contractor	32.3%	40.8%	36.6%	0.172
Location				
Rural	34.8%	48.3%	54.9%	**0.000**
Urban	47.0%	30.6%	28.0%	**0.000**
Both	18.2%	21.1%	17.1%	0.683
Health center patient population variables				
Mean total patients	17,285	19,769	21,077	.214
Mean percentage Medicaid patients	33.8%	31.1%	30.4%	.082
Mean percentage uninsured patients	40.8%	39.8%	40.2%	.877
Mean percentage elderly patients	7.1%	8.2%	8.7%	**.012**
Mean percentage Medicare patients	7.7%	8.9%	8.7%	.061

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[2] See for example http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/telehealthsrvcsfctsht.pdf

Variables	Provided no telemedicine services	Provided one telemedicine service	Provided two or more telemedicine services	ANOVA or X^2 significance
Mean percentage minority patients	48.6%	46.0%	46.8%	.693
Mean percentage patients requiring translation services	20.9%	20.3%	21.3%	.960
Health center staffing variables				
Physician FTEs per 10,000 patients	4.7	4.5	4.9	0.703
Mid-level provider FTEs per 10,000 patients	3.5	4.0	5.2	**0.000**
Medical FTEs per 10,000 patients	23.2	23.7	25.9	**0.035**
Dental FTEs per 10,000 patients	4.5	4.7	5.2	0.491
Mental health FTEs per 10,000 patients	2.0	2.6	2.4	**0.030**
Substance abuse FTEs per 10,000 patients	0.8	0.7	0.7	0.919
Enabling services providers FTEs per 10,000 patients	7.1	8.0	7.0	0.596
Quality measures				
Percentage of diabetic patients with HbA1c levels <7%	38.6%	42.2%	40.6%	**.007**
Percentage of diabetic patients with HbA1c levels <9%	70.4%	73.5%	71.0%	.053
BP control among hypertensive patients	62.8%	61.7%	60.3%	.337
Childhood immunization rate	63.9%	63.3%	64.9%	.885
Low or very low birth weight births rate	8.7%	8.6%	7.6%	.778
Pap test rate	55.4%	51.9%	53.4%	.203
Percentage of pregnant women with first prenatal visit in the first trimester	69.1%	71.8%	73.3%	.093
Funding variables				
Percentage of total revenue from Medicaid	30.5%	28.7%	27.9%	.303
Mean Medicaid dollars per patient	$555	$593	$604	.364
Received ARRA funding	70.7%	74.7%	81.7%	.110
Mean American Recovery and Reinvestment Act (ARRA) New Access Point (NAP) and Increased Demand for Services (IDS) funds	$154,794	$128,041	$135,722	.207
Mean ARRA Capital Improvement Project funds (CIP) and Facility Investment Program (FIP)	$146,088	$173,186	$192,444	.195

Variables	Provided no telemedicine services	Provided one telemedicine service	Provided two or more telemedicine services	ANOVA or X^2 significance
Percentage of total revenue from ARRA funds	5.7%	4.1%	4.3%	.086
Mean ARRA funds per patient	$41	$24	$28	.469
Mean ARRA funds per uninsured patient	$100	$77	$98	.537
Mean state and local funds	$1,312,620	$1,272,824	$1,501,310	.780
Percentage of total revenue from state and local funds	10.6%	9.6%	12.1%	.341
Mean state and local funds per patient	$77	$72	$152	**.002**
Mean state and local funds per uninsured patient	$223	$217	$1,587	**.024**
Percentage of total revenue from state and local funds	10.6%	9.6%	12.1%	.341

Discussion

The results of this survey indicate that over one in three surveyed health centers provides at least one telemedicine service. Health centers that offer telemedicine services are more likely to be located in rural areas and CHCs that offered two or more telemedicine services have more generous state and local funding. The locational finding seems intuitive because reimbursement streams support the provision of telemedicine in rural areas, while limiting the extent to which urban health centers can obtain reimbursement. While these data may reflect the perceived and real value that telemedicine provides in non-urban locations, where access to certain services and specialties may be particularly challenging, it is also likely a reflection of reimbursement rules which, in the case of Medicare, for example, restrict coverage to services rendered in rural health professional shortage areas or outside of Metropolitan Statistical Areas [2], limiting the extent to which urban health centers might offer such services.

Implications for Health Policy and Research

Research indicates that telemedicine services garner high patient and provider satisfaction and can offer access to specialty services, including behavioral health care, that are not available locally. Despite having demonstrated successful telemedicine experiences at CHCs in New York, California, and South Dakota, among other states, the expansion of telemedicine services at CHCs is limited by the availability of key trained personnel and reimbursement for services [13]. Medicaid reimbursement for telemedicine services is based on Medicare's definition of telehealth services and is covered at the option of states; according to a recent report, 42 states offer Medicaid reimbursement for telehealth services and 22 states provide reimbursement for telemedicine services offered by health centers [14]. Although telemedicine services can be of great benefit to rural and remote populations by providing access to services that are geographically remote, the value of telemedicine in urban settings should also be considered. Urban health centers also benefit from the use of telemedicine given the general challenges in

maintaining capacity for clinical [15], dental [16], and behavioral [17] services in underserved communities. Given the potential of telemedicine services to improve health centers' ability to served medically underserved populations, further study is needed to determine the extent to which CHCs' provision of telemedicine services is limited by reimbursement constraints and a shortage of consulting specialists and trained local providers who can facilitate the provision of telemedicine services.

Limitations

This survey provides the first and, to the best of our knowledge, only national estimate of the use and scope of telemedicine in community health center settings. Although the study findings are limited to the survey period of 2010-2011 and the survey did not specifically ask about barriers to the use of telemedicine services, they provide significant insight about some of the internal, organizational, and financial factors that likely influence health center adoption and use of telemedicine. We have also tried to minimize reporting errors by providing health centers with a standard definition of telemedicine services. We also believe misreporting is minimal due to health centers' regular self-reporting of UDS data, in which all grantees must submit information on adoption and use of electronic health records to HRSA, so health centers would be accustomed to providing detailed data on their use of health information technology.

Financial disclosure

The authors have no financial or other interests related to the research or resulting policy implications. The research was funded by RCHN Community Health Foundation.

Competing interests

The authors report no competing interests related to this publication.

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