Original Research

Sustaining and Expanding Telehealth:
A Survey of Business Models from Selected Prominent U.S. Telehealth Centers

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Abstract

Introduction: Telehealth centers across the country, including our own center, are addressing sustainability and best practice business models. We undertook this survey to explore the business models being used at other established telehealth centers. In the literature on telehealth and sustainability, there is a paucity of comparative studies as to how successful telehealth centers function. Methods: In this study, we compared the business models of 10 successful telehealth centers. We conducted the study by interviewing key individuals at the centers, either through teleconference or telephone. Results: We found that there are five general approaches to sustaining a telehealth center: grants, telehealth network membership fees, income from providing clinical services, per encounter charges, and operating as a cost center. We also found that most centers use more than one approach. Conclusion: We concluded that, although the first four approaches can contribute to the success of a center, telehealth centers are and should remain cost centers for their respective institutions.

Key words: *business administration, economics, policy, telehealth, telemedicine*

Introduction

Although the University of New Mexico Health Sciences (UNM HSC) Center for Telehealth has existed for more than 20 years, our function within the HSC had not previously been formally defined. That changed recently when we were designated as the core facility for telehealth. This means that we coordinate telehealth activities across the HSC, help develop and incubate new telehealth programs, and serve as a resource center.

Along with this designation came a request from the administration that we look into supplementary ways of funding our mission. We decided that this would be an excellent opportunity to survey other successful telehealth centers to discuss their business models. A perusal of the literature on telehealth sustainability shows a good deal of conflation between the terms "program" and "center." For the purposes of this report, we define "program" to be a discrete telehealth application at a particular institution, for example, teledermatology. We define "center" to be an organization, which facilitates and promotes telehealth usage. A telehealth center may or may not run one or more telehealth programs. In addition to providing guidance for us, the results of the survey would outline the spectrum of business models represented by some prominent telehealth centers.

Methodology

Creating telehealth business models that are sustainable is challenging for most institutions.[1] We decided that a good tactic would be to talk to other successful telehealth centers to examine their approaches to sustainability. We spoke with nine centers (see *Table 1*), which were selected based either upon our previous dealings with them or on their presence near the top of a Google search for "telehealth center" or "telehealth program." We specifically excluded some centers, which might be considered prominent for various reasons. For example, some telemedicine centers were not selected since they were known to rely heavily on grant funding, which we did not consider to be sustainable in the long term. Others were excluded because they were already included in an interview of a larger regional telehealth network. We also selected telehealth centers that represented a relatively wide geographical spread across the United States.

All of the centers can be considered successful in that: (1) they are known to the telehealth community nationally through presentations at national meetings and/or publications in peer-reviewed journals and (2) they have longevity—all have been in existence for more than 5 years. We focused

Table 1. Centers Included	
CENTER	**TYPE**
University of Virginia	Academic Medical Center
Georgia Partnership for Telehealth	Stand-alone Telehealth Program
University of Arkansas Medical Center	Academic Medical Center
Marshfield Clinic	Healthcare System
University of Miami	Academic Medical Center
University of Pittsburgh Medical Center	Academic Medical Center
University of Kentucky	Academic Medical Center
California Telehealth Network	Stand-alone Telehealth Program
Arizona Telemedicine Program	Stand-alone Telehealth Program
University of New Mexico	Academic Medical Center

on centers in the United States because we felt that the health payment system in this country exerts particular constraints on the business model. Five of the centers selected were directly connected to academic medical centers (AMCs). We included our own center for comparison.

We interviewed four of the centers through videoconference and the rest through conference call. We started the interview by explaining the change in our mission and our administration's request for developing sustainability. We then asked them one opening question: "Describe your business model." All of our other questions followed up on their response. Some examples are:

– What types of fees do you charge?
– How do you calculate the fees?
– Do you run a Network Operating System?
– How do you provide 24/7 technical support?
– Do you have any grant funding?
– Do you have contracts for providing clinical services?
– Who are your members?

As a final check on the accuracy of our perceptions, we circulated a copy of this article to all of the participating centers for comments shortly before submitting for publication.

Results
UNIVERSITY OF VIRGINIA

University of Virginia (UVA) telehealth was started with seed money from payers to cover the costs for uninsured telehealth encounters. They operate under a master agreement between the medical school, the medical center, and the physician group. They derive most of their income from fees, including:

(1) A per encounter charge for telehealth encounters within the University system
(2) Contract fees for services provided by the University through contract or grant
(3) Fees for the installation and use of secure desktop video and
(4) Fees for individual videoconferences, which may or may not be telehealth related.

The per encounter charges vary depending on the level of service provided. For a few applications, the Center is providing everything from scheduling and registration to managing patient follow-up. Most applications handle scheduling and registration through the regular medical center procedures. Emergency services are charged at a higher rate because of the need for 24/7 technical support. The Center has done a detailed cost and time analysis to support the rates.

GEORGIA PARTNERSHIP FOR TELEHEALTH

The Georgia Partnership for Telehealth (GPT) started out as a network operating center (NOC), but now also provides clinical and purchasing services to the network members. They still have some grant funding, but are generating most of their support from operations. Their major income streams are:

(1) Network membership fees charged to every endpoint (fees vary by the number of endpoints in each organization)
(2) Slight markups on equipment purchased for network members.

In return for the membership fees, network participants also receive scheduling services (through a system developed in-house), a credentialing support Web site, discounts from retail cost on equipment purchases, and 24/7 support.

The partnership has also developed a for-profit subsidiary that is engaged in international telehealth. They are looking at hiring their own providers to serve their domestic network with mental health services.

UNIVERSITY OF ARKANSAS MEDICAL CENTER

The telehealth program at the University of Arkansas Medical Center (UAMC) operates a network in the state. They charge membership fees to participate in the network. Fees vary by the type of endpoint as follows: clinical, educational, or desktop. The program has some grant funding and continues to pursue grants. The largest part of the Center's income is generated through providing services on Medicaid contracts.

The Center also runs a 24/7 call center that provides services and education for Ob/Gyn patients and mental health crisis intervention. In addition, the call center provides consultation services to Ob/Gyn providers.

MARSHFIELD CLINIC

The telehealth center at Marshfield Clinic is a cost center within the organization (a cost center is a division or part of an organization, which does not directly produce profits, but is necessary to the mission of the organization). They are able to justify this by keeping close track of the value they bring to the organization. The billing system allows them to accurately quantify how many unique patients have been served, how much billing accrues to each patient, and how much revenue they generate in ancillary services. They have calculated that each new patient generates an average of $275,000 in billing to the hospital over a lifetime.

UNIVERSITY OF MIAMI

The University of Miami telehealth center operates as both a cost center and a profit center. In addition to their University funding, they provide contract medical services in five areas as follows:

(1) State correction facilities
(2) State Medicaid waiver
(3) Employee health services for cruise lines
(4) Indian Health Services in Alaska
(5) Neurology (through Specialists on Call)

In its contracting, the Center has focused on the institution's clinical strengths.

UNIVERSITY OF PITTSBURGH MEDICAL CENTER

University of Pittsburgh Medical Center (UPMC) also operates as both a cost center and a profit center. In addition to central funding, the center provides stroke and psychiatry services through contracts.

As part of its central funding, the center provides home health monitoring (through the UPMC Medical Plan) and international services. UPMC also runs teleconsult centers in outlying areas.

UNIVERSITY OF KENTUCKY

The University of Kentucky telehealth center operates as a cost center. They also have two large contracts, one for correctional telehealth (both state and federal), which produces 4–5,000 encounters per year, and another industrial health contract with the coal mines. Neither of the contracts generates significant income for the telehealth center. Of course, neither of the contracts would be viable without telehealth since this would require sending providers to the remote locations.

CALIFORNIA TELEHEALTH NETWORK

The California Telehealth Network (CTN) has some state funding and also generates income from network membership fees. They are working toward full self-sufficiency. Fees are based on the size of the circuit, and most of the sites have contracted with the Universal Service Administrative Company (USAC) to reduce their costs. They currently rely on one vendor to provide network services, but are looking at other vendors to reach some of the more rural areas.

ARIZONA TELEMEDICINE PROGRAM

In contrast to all of the other centers, the Arizona Telemedicine Program (ATP) was started by an initiative in the state legislature. The ATP is housed at the University of Arizona and is organizationally a department in the medical school. In contrast, they are governed by a council consisting of members from both the public and private sectors and chaired by a present or former legislator. They receive an allocation from the legislature, which is separate from that of the University.

The ATP uses what they call an "application service provider" business model. This approach was popular in the software industry in the 1980s. Members pay an annual fee to belong to the network. The fee is independent of the size of the organization, but is somewhat related to the number of sites. This model has provided an unanticipated benefit in expediting Business Associate Agreements under HIPAA.

The ATP provides no medical services, but allows members to maintain and strengthen their traditional referral patterns. They do operate as a NOC, and also provide educational programming to members.

About 60% of ATP's budget is covered by the legislative allocation. The rest is split roughly evenly between membership fees and grants. A small portion of the budget is covered directly by the University.

UNM HSC FOR TELEHEALTH

As mentioned in the introduction, we are the core facility for telehealth activities at the HSC. We coordinate telehealth activities across the HSC, help develop and incubate new telehealth programs, and serve as a resource center. We also participate with HSC departments in research, evaluation, and analysis of telehealth technologies, programs, and impact on health outcomes.

We do not ourselves provide direct services and do not run a network. We currently function as a cost center. We have

in the past and continue to have some grant funding, both through grants to the Center and as participants in grants to other departments.

Examination of the responses of the 10 subject centers demonstrates five general approaches to sustainability:

(1) Grants
(2) Telehealth network membership fees
(3) Income from providing clinical services
(4) Per encounter charges
(5) Operating as a Cost Center

Most of the centers use more than one approach.

GRANTS

Grant funding has been essential to the development of many telehealth centers. The GPT, UAMC, and the CTN, in particular, were able to build out their network infrastructures through grant funding. Four of the programs we interviewed continue to use grants as a significant part of their funding mix.

Shannon et al. point out that there are advantages and disadvantages on funding from extramural sources. The advantages lie in a quick infusion of sometimes substantial funding. There are, unfortunately, many disadvantages most important of which result in a lack of sustainability.[2]

Some centers that we did not interview continue to rely on grants for the majority of their funding. We specifically decided not to interview any of these because we do not see this as a sustainable model. In fact, many grants now require a plan for sustaining the Center after the grant is over.

NETWORK MEMBERSHIP FEES

Telehealth centers that have built their own networks usually charge some type of membership fee to support that network. UAMC, for instance, charges an annual fee that varies by the type of endpoint—clinical members pay more than educational members (for clinical members using only desktop connections, the fee is less). The CTN charges a monthly fee that varies by the type of circuit. The GPT also charges a monthly per endpoint fee. The ATP charges an annual membership fee. While the fees for UAMC and the CTN cover only network services, the ATP provides education services and the GPT also provides scheduling, credentialing assistance, and discounts on equipment purchases.

Network membership fees are an obvious choice to support a network infrastructure and could also be used to support a telehealth center associated with the network. Of course for those centers that do not have their own network, this source of funding is not particularly relevant.

INCOME FROM PROVIDING SERVICES

Four of the centers derive at least some part of their support by providing contract clinical services directly from the telehealth center (as opposed to facilitating the provision of those services from a clinical department). UAMC gets a large share of its income from providing services on Medicaid contracts. UVA, Miami, and UPMC also derive significant income from providing contract clinical services. As mentioned above, Miami has taken this to another level by providing contract services to five different types of users.

The GPT and the CTN are both exploring the possibility of providing some clinical services along with their network activities.

Generating full program support by providing clinical services is extremely problematic. None of the centers derives all of their support from clinical contracts, although UAMC and Miami both note this source as significant. Clinical services can produce more than enough revenue to cover the time of providers and related support staff, but supporting a robust program development component would be another story.

More importantly, this approach separates services provided through telehealth from the same services provided in person. Telehealth is a collection of technologies for providing services, but the services themselves should not be different. LeRouge et al. point out that telemedicine should not be seen as a product in itself, but rather as a tool, which should be integrated into the usual work flow.[3]

PER ENCOUNTER CHARGES

UVA derives a significant percentage of its support from per encounter charges within the University system. The fee is a dollar amount that varies depending on the amount of service provided. For instance, departments that use the Center's scheduling and registration facility pay more than those who do their own scheduling and registration. Emergency services also pay more (mostly because of increased technical support requirements). The Center has done a detailed cost study to support these charges.

As with income from providing services and network membership fees, this method provides support mostly for the necessary infrastructure and not for any program development and management. It could also provide a disincentive to clinical programs that are considering telehealth because of the reduction in potential income.

COST CENTER

As mentioned above, a cost center is a division or part of an organization, which does not directly produce profits, but is necessary to the mission of the organization. The Center thus

receives ongoing support from the central organization. Since its not generating a positive return on investment (ROI), the cost center must demonstrate added value.[4] Cost centers are common in both public and private enterprises. Support departments, like Information Technology, are almost always cost centers.

Of the centers that we interviewed, all except GPT and CTN are in some way cost centers (note that both of these own their networks). Marshfield fully supports telehealth as a cost center.

Of course, the institution requires some justification for supporting telehealth as a cost center. Miami proposes that telehealth is a sales staff for the physician practice, generating additional income for the institution. Marshfield keeps detailed track of data to justify the total value that the center brings to the organization. For instance, they know, on average, how much each patient brings in as ancillary fees.

Discussion

The literature on sustainability in telehealth deals mostly with the viability of individual applications, with very few articles directed toward center sustainability. This is understandable, since the focus in the field of telehealth has been on finding how it can be useful in a number of disciplines. As the core facility for telehealth at an AMC, we were interested in how other telehealth centers achieve sustainability.

We did find four articles that touched, at least in part, on the areas we were concerned with. The ATP has documented in detail how their center started and what they do to keep it functioning.[5–7] Shannon et al. wrote specifically about a model for telehealth at the University of Michigan Health System, an AMC.[2] Similarly, Nesbitt et al. described the center at the University of California Health System at UC Davis.[8] At a higher level, LeRouge et al. discussed the strategy for sustaining a telemedicine center, without going into the details of a business model.[3] While all of this literature is helpful, it is not exhaustive and with the exception of LeRouge et al., focuses on single centers.

The literature on business models is extensive. According to Zott et al., there have been at least 1,177 articles in peer-reviewed journals that address the concept of a business model.[9] Several (Chen et al., LeRouge et al., Valeri et al., and Yellowlees) deal specifically with telehealth.[3,10–12] A few (Hedman and Kallling, Osterwalder, and Pigneur) propose rigorous and complex schema for the description and evaluation of business models.[13,14] Although using one of these would be a promising approach for a research project, it was beyond the scope of what we intended.

One often cited article delivered the basis for our approach: "Business models, though, are anything but arcane. They are, at heart, stories."[15] A business model also "…answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?"[15]

Of course, a major part of achieving sustainability is demonstrating value to the institution.[16] This becomes even more complicated in an AMC where there may be a need to demonstrate educational or research benefits.[17] The value of scientific evidence to the institution cannot be underestimated. Both Nesbitt et al.[8] and Shannon et al.[2] point out the importance of research and scholarly work to all components of AMC's.

Another facet of value to the institution lies in the telehealth center's ability to develop new programs, which improve the efficacy and efficiency of treating patients. Shannon et al. give examples of four successful patient care programs, which were developed at the UMHS telehealth center.[2]

As noted in the results, the majority of telehealth centers have been established as cost centers that may be supplemented with grants, contracts, or other user fees. Furthermore, demonstration of the additional value added to the health system can assist in justifying the institutional support as part of the ROI, such as fostering stronger business and referral relationships with established, or potentially new, customers, as well as enhanced extension of, and access to, services through the use of telehealth. In this manner, telehealth services are viewed as a utility within the respective health systems that bring direct or indirect value, ROI, and integration within the overall strategic direction of that health system.

As mentioned in the Methods section, the selection of centers included in this study was not particularly rigorous. We do, however, believe the results to be indicative of practice in U.S. telehealth centers. A more thorough study might use more specific criteria for defining what constitutes a "successful" center, such as number of specialist areas, volume of consultations, level of funding, and number of publications. Future research and evaluation might also use this preliminary random study to develop a standardized list of questions for these types of surveys.

In summary, this study provides a snap shot in time of the current diverse business models being applied in a spectrum of selected telehealth centers in the United States aimed toward sustainability and expansion of telehealth within their healthcare systems. Future studies may determine which models can truly lead to meaningful ongoing sustainability.

Disclosure Statement

No competing financial interests exist.

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