Spring 2005

Rural California and the Expansion of Health Service Delivery: A Proposal to Evaluate the Long-Term Sustainability of Northern Sierra Rural Health Network's Telemedicine Program

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RURAL CALIFORNIA AND THE EXPANSION OF HEALTH SERVICE DELIVERY:

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PROGRAM

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EMPA 396

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Spring II, 2005

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Abstract

Over 75 percent of California's landmass is rural and that area is home to 3.8 million residents. Rural hospitals and clinics confront big obstacles like professional staff shortages, weak local economies, geographic isolation and loss of rural status with population increases. Telemedicine may provide a viable solution because telemedicine offers access to specialty health care providers in the form of consultation, diagnosis, and limited treatment options via the use of two-way video and audio connections. Rural healthcare systems are fragile and difficult to fund, so it is imperative that rural clinics and hospitals utilize the most efficient option in order to meet rural health care needs of those who reside in rural and medically underserved areas.

The purpose of this paper is not to evaluate telemedicine but rather to identify whether the Northern Sierra Health Network's Telemedicine Program can achieve independent financial viability.

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Chapter I
Introduction

There is not a universally accepted definition of telemedicine, though many forms of telemedicine have been practiced for over thirty years. The word itself is derived from the Greek word *tele,* which means far off and the Latin word *medicus,* which means physician, thus a literal definition would be *physicians practicing medicine from a distance.* Today, telemedicine applications can range from high-resolution still images, such as x-rays being transmitted to a radiologist in another town to sophisticated video teleconferencing systems allowing a rural patient to have a consult with an urban specialist. In rural and remote areas, where the distance between a patient and a health professional can be hundreds of miles, telemedicine can mean access to health care that a patient would not otherwise have.

Uneven access to healthcare is a serious problem. The uneven access has typically been related to lack of insurance and/or the high cost of insurance because of the attention that health care reform proposals have produced since Theodore Roosevelt. But cost of health care was and is not the only problem. That was highlighted by the 1991 election of Democratic Senator Harris Wofford in Pennsylvania who said, "If criminals have the right to a lawyer, I think working Americans should have the right to a doctor"

(Kingdon, 1995, p. 218). Uneven access to healthcare is a problem that impacts

approximately 3.8 million rural residents of California (CSRHA, 2004). Rural residents

are forced to travel long distances in order to obtain healthcare because local health care

facilities do not have the professional staff to address their health concerns. The

increased need to commute for rural residents in order to access healthcare has negatively

impacted air quality in these regions. California's rural hospitals and clinics often

struggle to stay open. Many rural hospitals have been forced to close down due to Health

Maintenance Organizations (HMO's) having decreased coverage in rural areas

(decreasing the number covered services in a rural area, such as diagnostic procedures).

Or ceased coverage in rural areas by ending an HMO contract with a rural community

hospital thus forcing patients with HMO coverage to change physicians and travel to the

nearest facility with a HMO contract. Rural communities lose health care revenues and

lose professional retention. Telemedicine has been a method of meeting the challenges of

obtaining adequate access to healthcare services in rural areas while maximizing

professional expertise in areas where specialists are limited.

Though rural applications of telemedicine programs seem the obvious choice for

enhancing health services delivery in rural settings, just defining what is rural has posed a

huge barrier that has hampered the implementation of telemedicine programs even before

they start. Telemedicine requires initial funding to get started. However, in order to

evaluate telemedicine, it is important to evaluate public policy issues that preclude initial

funding for telemedicine is rural areas. Often, eligibility requirements for rural clinics

have numerous barriers and long term funding to sustain a program is rare. Funding is

difficult to obtain because state definitions and methodologies of rural differ from definitions used at the federal level.

In California, these definitions vary just enough to cause some rural areas and providers to be designated as rural for state purposes, but not rural for federal purposes thus making funding difficult to obtain. A California definition of rural as defined by the California Health Manpower Policy Commission (Census, 2004) details that populations per square mile cannot exceed 250 persons and incorporated areas no greater than 50,000. In contrast, the federal government utilizes several methods on how they determine if a geographic area is rural or urban. These methods range from a metropolitan-non-metropolitan classification system developed by the Office of Management and Budget to the Census Bureau's definition of rural and some methodologies and definitions utilized by the Department of Agriculture (HRSA, 2004).

Problem Statement

Research has indicated that barriers to telemedicine loom large; however, very little research has been done on the most effective ways to create self-sufficient telemedicine programs. The needs for telemedicine in rural and medically underserved areas still exist despite multiple federal funding programs since the 1960's. Inadequate funding and reimbursement issues will continue to negatively impact existing telemedicine programs. The continued success and growth of telemedicine is also dependent on how program administrators address these barriers and whether or not they implement strategies in order to achieve continual independent funding.

Purpose of the Study

The purpose of this paper is to evaluate the long-term sustainability of Northern

Sierra Rural Health Network's Telemedicine program. The primary focus of the

evaluation is to assess the strategic planning from three separate, yet interrelated,

perspectives: (1) a rural provider perspective, (2) an administrative perspective, and (3) a

stakeholder perspective. The evaluation was designed to answer the following questions:

1. Is there a strategy in place to achieve sustained funding for the current
   telemedicine program?

2. What are the organizational problems and barriers of implementing,
   maintaining, and sustaining a telemedicine network?

3. What organizational structure is most conducive for success in a telemedicine
   network?

The hypothesis of the paper is: *Telemedicine must be able to pay for itself in order to*

continue as an expansion of healthcare delivery.

Limitations of the Study

While the focus of this project is on the economically successful implementation

of a telemedicine program in the nine rural counties of northeastern California, the

serious consideration of this electronically driven adjunct to medicine is a universally

appropriate area for study as an increasing number of people in developed and

developing areas demand access to life sustaining care. The scope of this study could not

begin to examine the various worldwide applications, military applications, or other

potential applications of telemedicine although the goals for its use would be similar, that

being a more expeditious and cost -effective way to extend medical expertise to the

greatest number of people. This research will focus on civilian applications of telemedicine within the Northern Sierra Rural Health Network, which encompasses Lassen, Plumas, Sierra, Nevada, Modoc, Yuba, Trinity, Shasta, and Siskiyou counties.

Chapter II
Literature

Background: Not until the late 1990s were there explicit policies in place for private and

public third-party payers to pay for telemedicine services. The Balanced Budget Act of

1997 marked a noteworthy change in Medicare payment policies, which opened the door

for telemedicine reimbursement; however, according to Gerston, (2004) these

considerations only create an acknowledgment to the importance of an issue, yet produce

minimal change because they are considered a token or symbolic response. Partial

Medicare reimbursement for telemedicine services was authorized in the Balanced

Budget Act (BBA) of 1997. The narrow scope of this reimbursement prompted efforts to

expand and revise the Medicare reimbursement regulations. The Benefits Improvement

and Protection Act of 2000 (BIPA) included amendments to the Social Security Act and

removed some of the prior constraints; however, the Balanced Budget Act still

maintained substantial limitations. The first is related to geographic location, the Act

does not expand coverage to all rural communities. Secondly, the act limits

reimbursement to only originating sites that meet specific criteria as a Critical Access

Hospital, Rural Health Clinic or a Federally Qualified Health Center. For example, a

practitioner providing a telemedicine service to an assisted living facility would not be

reimbursed because the assisted living facility is not an eligible site for a Medicare

telemedicine facility fee. Reimbursement is linked to the originating site; so, restrictions

were placed on practitioners' reimbursement by linking their professional payment only

to sites eligible for facility fees. In addition, the act has a narrow definition of what are

eligible telemedicine services (OAT, 2001)

The Health Resources and Services Administration established the Organization for the Advancement of Telehealth (OAT) for the purpose of supporting "telecommunications for technical assistance, training, and knowledge exchange among grantees, clinicians and other health care professionals, especially those providing services to low-income, medically underserved or isolated Americans" (HRSA, 1998).

Private third party payers, which include managed care plans, have been reluctant to pay for telemedicine. Typically looking to Medicare as a model, they have been slow to incorporate telemedicine as covered services due to the complicated rules and regulations of the current policy under the Balanced Budget Act. Federally funded programs such as Medicare and Medicaid (or Medical in California) only provide limited coverage, which include services where face-to-face contact is not required between patient and physician.

Literature: Relevant articles specifically addressing a programs' need to achieve independent financial viability revealed articles addressing a number of components required for long-term sustainability of a telemedicine program that equally support the hypothesis. Despite the lack of systematic empirical research, program administrator and practitioners suggest program goals should be thoroughly developed and "clearly defined program outcomes are fundamental to the operation of any program" (Chen, 2005, p 83). The secondary research material will be evaluated to determine the validity and credibility of the hypothesis. Independent financial viability is a variable that works in conjunction with other variables in order to achieve long-term sustainability of telemedicine programs and those variables will be evaluated in order to determine if a intervening variable and sub-hypothesis should be included in this study (True, 1989,

p.61) The literature covers four main areas; barriers to implementation and use; stakeholders; strategies for funding; and attributes of high-performance organizational models.

Barriers to Implementation and Use

Expanding access to medically underserved populations was a primary reason for the advancement of telemedicine, which was illustrated in the following four studies. Medically underserved areas were targeted in the early days of telemedicine as noted in an older article entitled: Healing by Wire (Purvis, 1992) where it stated "Telemedicine allows people in medically underserved areas to use ordinary telephone lines to consult with highly trained medical specialists whom they could not otherwise afford to see. Unfortunately, as noted in article, Now getting paid for it (Tieman, 2000) the medically underserved area designation is what is needed to qualify for federal reimbursement. The Centers for Medicare and Medicaid services (CMS) make reimbursement a matter of definition, which eliminated a number of rural clinics and hospitals. As stated in the article, "The Balanced Budget Act of 1997 first opened the door for (telemedicine) reimbursement, but there was enough statutory vagueness that when the final rules were promulgated by CMS, reimbursement could actually occur (only under very limited circumstances)," says Glenn Wachter, research associate with the Portland, Ore.-based Telemedicine Research Center, which is affiliated with the Association of Telehealth Service Providers. On Nov 2, 2001, the Centers for Medicare and Medicaid Services (CMS) issued its final rule regarding the reimbursement of telemedicine services under Medicare, Medicaid, which went into effect on Jan 1, 2002. The Benefits Improvement and Protection Act of 2000 expanded reimbursable telemedicine services; however, it

may not be enough to expand the delivery of telemedicine according to article <u>Payment</u> <u>and other legal obstacles slow telemedicine growth</u> (Jones, 2004). The Benefits Improvement and Protection Act increases eligibility for rural areas that may not qualify as medically underserved because they have primary care healthcare professionals, but still lack specialists such as cardiologists, dermatologists or neurologists whose services could be obtained through telemedicine. Although the act has expanded geographic eligibility, "it still limits coverage in medically underserved areas by defining originating sites" the term originating site means the site where the patient physically is when the service is provided via a telecommunications system. As mentioned in the article, even though "the Act expands reimbursable telehealth services, it may not be enough to expand the delivery of telemedicine." (Jones, 2004)

Another cited barrier was due to the lack of health care providers accepting and using telemedicine. Provider acceptance to the use of telemedicine has been lower than patient's acceptance to the use of telemedicine. Physician reluctance may reflect issues such as lack of behavioural and financial incentives. However, if the technology is not easily accessible to them, there is a high probability that it won't be used and if there is no reimbursement for services that can compound the lack of use. A study performed in 1999 noted another barrier. The study involved more than 400 physicians from a variety of specialties in tertiary and public hospitals in Hong Kong that found notable differences in reluctance to using telemedicine by specialty. The reluctance was noted in those physicians with single specialties opposed to those physicians with multiple specialties. The results of the study indicated that radiologists, pathologists and surgeons were the most frequent physicians to adopt the use of telemedicine whereas family practitioners

were the least likely to adopt the use of telemedicine. The managerial standpoint gained from this study was that of planning, as stated, "in order to foster individual intentions to use a technology, it is important to encourage and cultivate a positive attitude toward using the technology" (Hu, Chua, Sheng, Tam, 1999, p. 17).

Stakeholders

The following articles noted the importance of involvement from all stakeholders in order to promote, maintain and sustain telemedicine programs.

In an influential article entitled *Lessons in telehealth: setting up a telemedicine program-- Here are some pointers garnered from successful—and unsuccessful— initiatives around the globe* (Brown, 2002). The article stressed how critical it was to have all stakeholders buy into the program from physicians to office managers of clinics; it takes everyone's participation to create a successful program. The article had excerpts from a feasibility study done for Northern Ontario Telehealth Network (NORTH) that listed the results of that study, mentioning the main components, barriers and strategies that need to be recognized prior to starting a telemedicine program. An A to Z listing of what is required from having the program driven by clinical leaders to having a strategy in place in order to sustain funding. The article concluded with the statement, "Getting a telemedicine program up and running requires sufficient resources and a lot of planning and hard work. While technology deployment is often the most visible component of a telemedicine program, it is the program strategy and organization that will make or break it" (Brown, 2002).

Program strategy should also include acceptability and should be integrated as smoothly as possible, as noted in the article entitled: *Telemedicine still looks for inroads*

to total acceptability (Krizner, 2002) and the other article was a case study entitled:

Telemedicine, hospital viability, and community embeddedness (Sykes, McIntosh, 1999).

Both articles provide perspectives that offer both the benefits of telemedicine and the

hurdles that telemedicine must overcome in order to be accepted. One benefit of

telemedicine was, "a savings from these consults at nearly $1,000.00 per patient, taking

into account specialist fees, ambulance hospital rates" (Sykes et al., p.7, 1999).

Telemedicine has also increased continuing medical education. One of the first consults

during the case study (Sykes, McIntosh, 1999) resulted in the diagnosis and stabilization

of an infant girl who is known in her hometown of Presidio Texas as me'ha, the miracle

baby. Both authors; however, do state, "Despite several successes, telemedicine is not a

widely used practice by physicians regardless of its promise to bring medical expertise to

all people and despite location or socioeconomic status." (Krizner, 2002, page 1).

Krizner (2002) elaborated on issues that hinder the use of telemedicine stating that they

have to be resolved in order to increase access of medical care to rural areas. The issues

include:

"1) Reimbursement, 2) Licensure, 3) Expanded coverage area by Medicare and private

health plans, 4) Adequate infrastructure in rural areas, and 5) Costs of technology coming

down" (Krizner, 2002, page 1). Comprehensive review of these articles indicated that

telemedicine could increase access; however, telemedicine has to be accepted by the

community in which it resides and "ultimately, it will be consumers who decide the fate

of telemedicine"(Krizner, 2002, p 1).

An article written for the Canadian Journal of Rural Medicine emphasized,

"health care delivery models work best when the stakeholder is involved in the planning

process…telemedicine is supposed to help close the gap in health care between stakeholders: the patient whose access to health care may be compromised by distance or limited resources and the provider of care" (Campbell & Martel, 1999, p. 4). There were three factors that were stated as critical for achieving successful telemedicine. Process guidelines were the first of three, which began with establishing a process in order to identify essential stakeholders. The stakeholders need to have a steering committee where all stakeholders participate so that central decision-making is avoided; goals and processes are created and agreed upon by all involved in an effort to obtain project goals. The second of the three guidelines was the need to self assess in an effort to maintain focus of the programs goals highlighting expectations and accomplishments. The third is again about involvement of all stakeholders in evaluating service modeling as described in the article as providing the structured environment for the costing, planning and implementation processes. The authors noted, "Critical to the success of any network is the fact that the expectations-setting process must be addressed to keep a program focused…having identified the challenges, the team starts by considering potential solutions" (Campbell & Martel, 1999, p. 1).

Applications of telemedicine in home health were highlighted in an article written for Nursing Management. Again, stakeholder support and involvement were critical to the success of the telemedicine program. The article presented a practical approach to the process of implementation and increasing the probability to success of the program. The steps were identified by first selecting the appropriate patient population for home health services, getting involvement and feedback in order to facilitate the best outcomes for the program. Selecting the most appropriate equipment to meet the goals of the identified

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patient population, then formulating a business plan with involvement of stakeholders. Marketing the service, developing policies and procedures and educating staff were additional steps noted. According to the authors it is critical to have stakeholder involvement, "Because home health is a referral-based service, the providers and the agency have a critical relationship…support from these essential stakeholders form the basis of the program's success" (Josey & Gustke, 1999, p. 4).

Strategies of Funding

The federal government has been instrumental in funding telemedicine programs in order to address the disparity of access to health care services. The subsequent articles highlighted ways to creatively implement strategies in order to achieve continual independent funding this was a topic of researchers from the U.S. Department of Commerce, Office of Technology Competitiveness, Technology Administration (Brantley,D,Laney-Cummings,K,& Spivack, R., 2004) . They authors noted that established telemedicine programs have learned to blend funding from a variety of sources. This in-depth study discussed the factors that impact the implementation of telemedicine programs focusing on organizational, process and coordination issues. The principle findings were numerous, reiterating the legal, financial and regulatory barriers. However, in addition to those barriers, the authors highlighted that more effective coordination by federal stakeholders was necessary to not only heighten awareness but to create more effective planning, information exchange and policy development for the application of telemedicine. The report also stated "Successful telehealth programs have relied on the multi-use aspect of their technologies" (2004, p. 113). The definition for

multi-use in the report mentioned videoconferencing applications for distance learning, community education, and professional conferencing. The report also noted the dichotomy for rural telemedicine networks when it comes to sustainability without external assistance. The report indicated that the more rural the geographic location and the less affluent and the higher the number of underinsured the more probable the rural telemedicine network would require external financial assistance to offset operating expenses. Then the authors pointed out the catch twenty-two by stating "At the same time, budgetary pressures of state and federal grant making agencies and third party payers have required that telehealth programs become self-sustaining" (2004, p. 115).

Expansion of healthcare delivery and defining funding requirements was delineated in a 2002 study prepared for the Office of Health and the Information Highway Health of Canada entitled: <u>Telehealth an Electronic Health Record: A Guide to Sustainability</u> (2002). The approach outlined in this article described the need to develop a strategy for sustainable funding by identifying funding sources for each element of the telemedicine program. For example, clinical telemedicine services would be funded by a combination of government funding (Medicare, MediCal) and private insurance reimbursement for services. Expansion and development efforts should rely on grant funding as only part of their sustainability. The article noted that there is truly a plethora of literature revealing non-coordinated, non -self-sustaining telemedicine programs and said that this makes the ultimate success of regional network all the more demanding. It is vital for a telemedicine program to establish an area for operations funding that will enable the program to continue when the grants stop.

An article entitled: <u>Secrets to success</u> (Chin, 1998) began by stating, "crafting a well-thought out financial plan that addresses how to pay for the technology and how physicians will be paid for their services" is one of the top issues that program administrators and organizers of telemedicine programs must address early in the planning process. However, the Arizona Telemedicine Program operated by the University of Arizona's medical school had a clearly devised plan prior to initiating their program. Taking about a year to plan their telemedicine network, the Arizona Telemedicine Program was fortunate to obtain state and federal funding to offset start-up implement of their program because the state saw telemedicine as a way to reduce costs for the state's prison population. Also, they used a portion of their state funding to pay rural physicians as a way to encourage participation and utilization. By carefully assessing the needs of the rural communities, establishing commitment by the physicians, and keeping the technology appropriate to fulfill the requirements, the Arizona Telemedicine Program was off to a solid start. The organizers still stated that the challenge is eventually making the network self-sufficient; however, they said that you must look at avenues to do just that.

Attributes of a High-Performance Organizational Model

It has been stated by many authors of Public Administration that there are essential characteristics of high-performing organizations that make them more effective, efficient and adaptable (Popovich, 1998). A review of three articles examined these characteristics. Attributes of successful telemedicine programs were defined by a study performed by the University of Michigan Health Systems. The report entitled: <u>Organizational models of Telemedicine and Regional Telemedicine Networks</u> (Bashshur,

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2002) began by stating, "It should be mentioned that there are few mature and self-sustaining telemedicine systems" (Bashshur, 2002, p 61), which was followed with a descriptive summary avowing that there are specific attributes to successful telemedicine programs. Despite variations in internal processes or diversity of programs each successful telemedicine program was noted to have nine basic attributes that were interrelated and not mutually exclusive, yet specifically noting that they must be financially self-sufficient and "be based on a sound economic framework, which delivers significant value for the investment" (Bashshur, 2002, p. 64). A successful model for telemedicine as described by the author should have a clearly expressed mission that provides clearly defined goals so that they can be achieved and a governance structure for accountability. The third attribute is to have a well-defined target population (particular diseases, regions) with the fourth attribute as identification of service providers to participate in the program that have various specialties. Procedures outlined as to the specifications of the services provided and quality assurance administration are the fifth and sixth attributes. Very detailed procedures for all activities (receiving requests, scheduling, consults, etc.) need to be discussed so that staffing considerations are known up front and the economic framework to support the services are the eighth and ninth attribute. The article did not dispute however, that there continues to be regulatory and reimbursement barriers that must be addressed.

The state perspective has been changing more rapidly from the traditional monitoring, purchasing, and service delivery paradigms and evolving toward public/private partnerships with value-based purchasing, accountability and responsiveness to stakeholder needs. An article entitled: Health information systems and

the role of state government points out this trend. The authors Daniels Mendelson who holds a master's degree in public policy from Harvard and Eileen Salinsky who holds a master of business administration degree from Temple University provided a unique perspective in their evaluation of state government efforts on the health information frontier. Their prologue began by stating, "The idea that information plays an important role in performance measurement and quality assurance in health care settings is neither new nor controversial. And yet a lack of useful, relevant information to support medical and health care decisions has long plagued clinicians, policymakers, and the public alike" (Mendelson & Salinsky, 1997, p. 106). The article detailed the challenges that programs like telemedicine face, which included governance, management, funding, and confidentiality and security. Yet, the article also discussed the achievements made by some states and touched on lessons for states that wish to establish similar programs. With reference to governance and telemedicine the authors of this article are using it in relation to one of the three conceptions of governance, that being as a body of theory that grasps institutional and lateral relations; one that sees borders as areas to transcend not as jurisdictional limits (Fredrickson, 2003). Some of the most successful telemedicine programs were highlighted as multi-state efforts that involved a number of funding partners. The three-state collaborative telmedicine network of Colorado, Kansas, and Nebraska was one multi-state effort mentioned that has successfully provided an expansion to health care services to frontier and rural facilities. Public/private partnerships were noted as a way to improve efficiency and reduce costs, as was a need to have a flexible governance management structure. However, despite the differences from state to state, the article discovered a few general principles of system and organizational

design from their study that lends to a successful telemedicine network. Starting with broad public/private participation in order to motivate stakeholder interests, also noting the need for the program to focus on realistic goals and objectives with clearly defined purpose and feasibility issues kept in mind and the state government needs to be participatory from the beginning in order to be untied with the program goals.

There are opponents to telemedicine who feel that it is a threat to the physician-patient relationship no matter how well organized the telemedicine program may be. As mentioned in article: <u>Telemedicine, A cautious welcome.</u> This article was one of the few that presented the opinions of the opponents to telemedicine by stating, "They suspect that its costs vastly exceed its benefits and that it is yet another example of toys for boys" (Wootton, 1996, p. 1375). Though the article offered both the proponents and opponents to the subject of telemedicine, the author took an objective approach intending to discover whether the introduction of telemedicine was due to the healthcare profession or was it due to the push of equipment manufactures. His finding highlighted the need for telemedicine and the components and perspective needed to implement a successful telemedicine program. The author emphasized that telemedicine is not a technology; but rather a process of doing traditional medicine better because there is no other alternative in some cases where a patient is remote. The author stated, "It cannot be overemphasized that simply buying the box won't enable you to practiced successful telemedicine…any more that buying a scalpel will turn you into a surgeon" (Wootten, 1996, p. 1338) instead the author noted that telemedicine has to be guided by certain principles, which he listed, but summed up with a few sentences starting with clearly knowing why you are wanting a telemedicine program and confirming that providers, stakeholders are on board with

you. Secondly noting, "Successful telemedicine requires not only the right equipment but, perhaps more important, a change in the way that medicine is organized and services are contracted for" (Wootten, 1996, p. 1338). It is more a danger to implement a program that an area is not ready for, it should have support and be viewed as a mechanism to provide an expansion of health care to those in rural areas and a mechanism for "exporting expertise" (Wootten, 1996, p. 1339) for those physicians who consult from their urban offices.

Chapter III
Methodology

The evaluation used both qualitative and quantitative methodologies to capture the history and outcomes of the Northern Sierra Rural Health Network. Qualitative tools included multiple key informant interviews and a comprehensive review of source documents. Quantitative approaches include analysis of surveys that targeted rural health providers and administrative stakeholders of the Northern Sierra Rural Health Network health organization.

The hypothesis for this study asserts that telemedicine must be able to pay for itself in order to continue as an expansion of healthcare delivery. The independent variable is for telemedicine having to pay for itself and the dependent variable is continuing as an expansion of healthcare delivery.

After analysis of both qualitative and quantitative data an intervening (control) variable was determined to have an influence on the relationship of the independent and dependent variable. For purposes of this study a sub-hypothesis is included.

Hypothesis 1: Telemedicine must be able to pay for itself in order to continue as an expansion of healthcare delivery *(Sub-Hypothesis) and financial viability is greater in telemedicine programs with stakeholder participation*

Independent variable: Telemedicine having to pay for itself

Dependent variable: continuing as an expansion of healthcare delivery

Intervening (control) variable: stakeholder participation

Key Informant Interviews

Initial interviews of program administrators and physicians both involved with the Northern Sierra Health Network Telemedicine Program and with telemedicine programs from other regions were conducted in person or by telephone to provide direction concerning the fundamental issues, gather information regarding history and background and additionally identifying informants who played a significant role in telemedicine for Northern Sierra Health Network's Telemedicine program.

Pre-survey drafts were administered to four telemedicine coordinators for feedback and suggestions. One of the four-telemedicine coordinators was from a telemedicine network in another state. Questionnaires were developed from the information compiled from the pre-survey drafts and from the initial interview items discussed below.

Key Informant Initial Interview Items

1. Do you think the current program is effective?

2. What modifications would you like to see?

3. Are there additional contacts that should be interviewed?

Based on information gathered from the key informant initial interviews, four more key informants were identified. One of these individuals is a telemedicine program coordinator from U.C. Davis Medical Center and the other is a telemedicine program coordinator Blue Cross of California, both are funding agencies for telemedicine programs. A representative for the California Telemedicine & eHealth Center was another funding agency interviewee. Additionally, a program coordinator within the Northern Sierra Rural Health Network, but in an administrative services office was

another interviewee. A survey instrument was developed and used as a guide to interview the six key informants. The survey questions were emailed to all six key informants in advance. This procedure ensured ample time for the individuals to prepare and collect supporting documentation if necessary.

Operational Definition

Operationally defining exactly how a variable or variables are measured is an important but most difficult part of a study. For the purposes of this study the term telemedicine network is the geographical region of northeastern California, which is the geographical area of Northern Sierra Rural Health Network's Telemedicine Program. In Figure 1, the Northern Sierra Rural Health Network has the hub site, also described as the bridge, located in Redding and transmits to the spoke sites by ISDN line (integrated service digital network), DACS (digital access cross-connect systems), T1 and FT1 (dedicated phone connections that support data transmission rates of 1.544 Mbits per second) are the method of transmitting to only three of the twenty-five sites and those sites are Alturas, Burney, and Susanville.

FIGURE 1

NSRHN Video Network
Updated June 2003
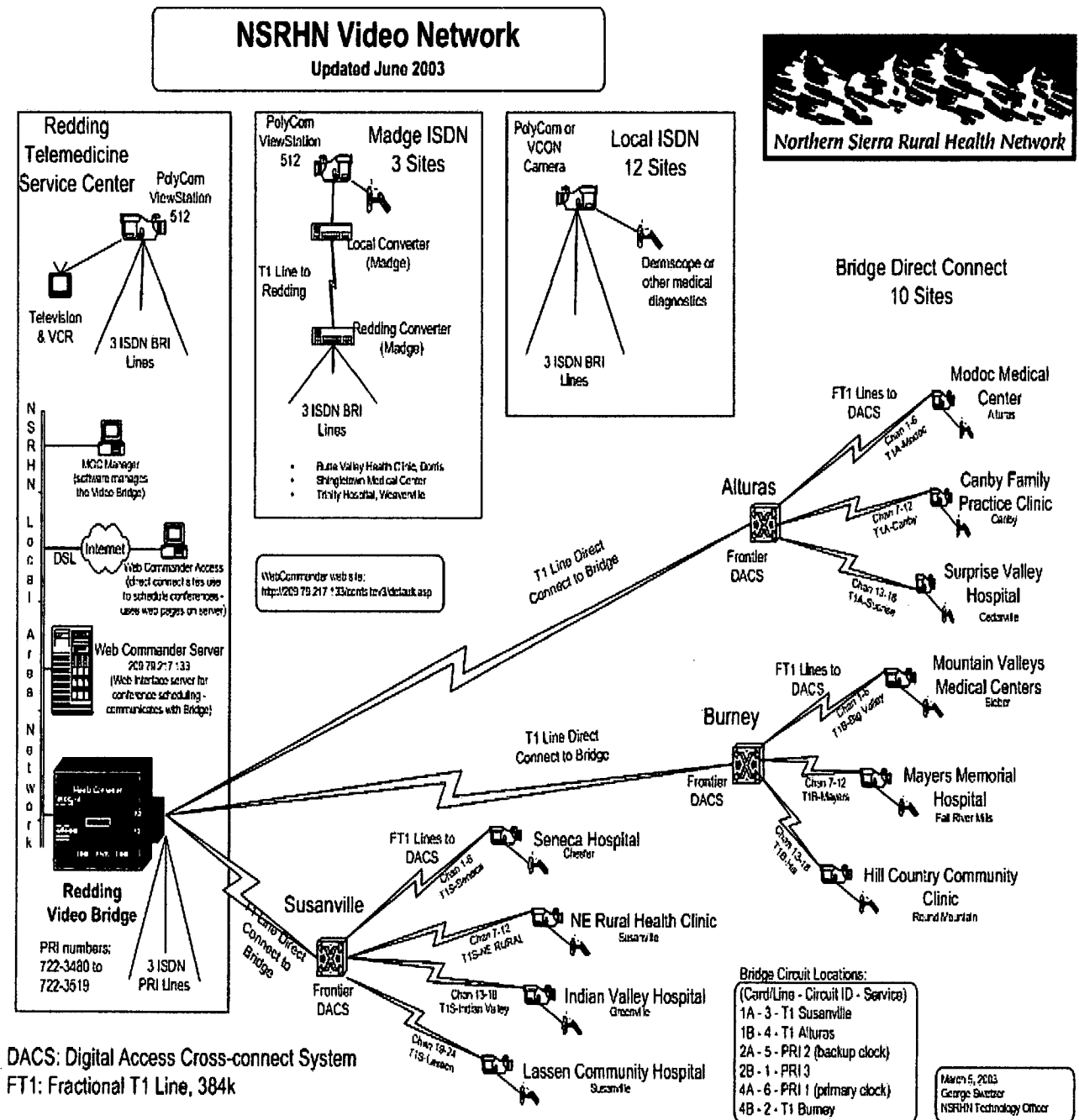
The Northern Sierra Rural Health Network's hub site (bridge) is a service center.

Hub sites are typically located in larger medical facilities, which can also be hospitals or

medical centers. The spoke sites are in twenty-five rural settings within the eight county

region of Northern Sierra Rural Health Network. The sites include small community hospitals, clinics and health care offices. T-1 lines connect three of the spoke sites as shown in Figure 1 and fifteen spoke sites are ISDN connected.

For purposes of this study, the terms self-sustaining, being able to pay for itself, and financial viability are defined as monies to cover operating costs of the program, monies generated by the program and separate from those monies received as grant funding allowing the telemedicine program to break even or run at a profit. Operating costs are those costs associated with the telecommunications infrastructure (telephone lines, costs incurred by the network from the telephone company for having the lines)

For purposes of this study, expansion of healthcare delivery means looking at telemedicine as another legitimate medical services, not a technology. Rather a medical service that expands access of health services to those people who reside in rural, remote and isolated areas that would not otherwise have access to healthcare.

For purposes of this study, stakeholder participation means physician (both referring and consulting physicians) use of the telemedicine technology.
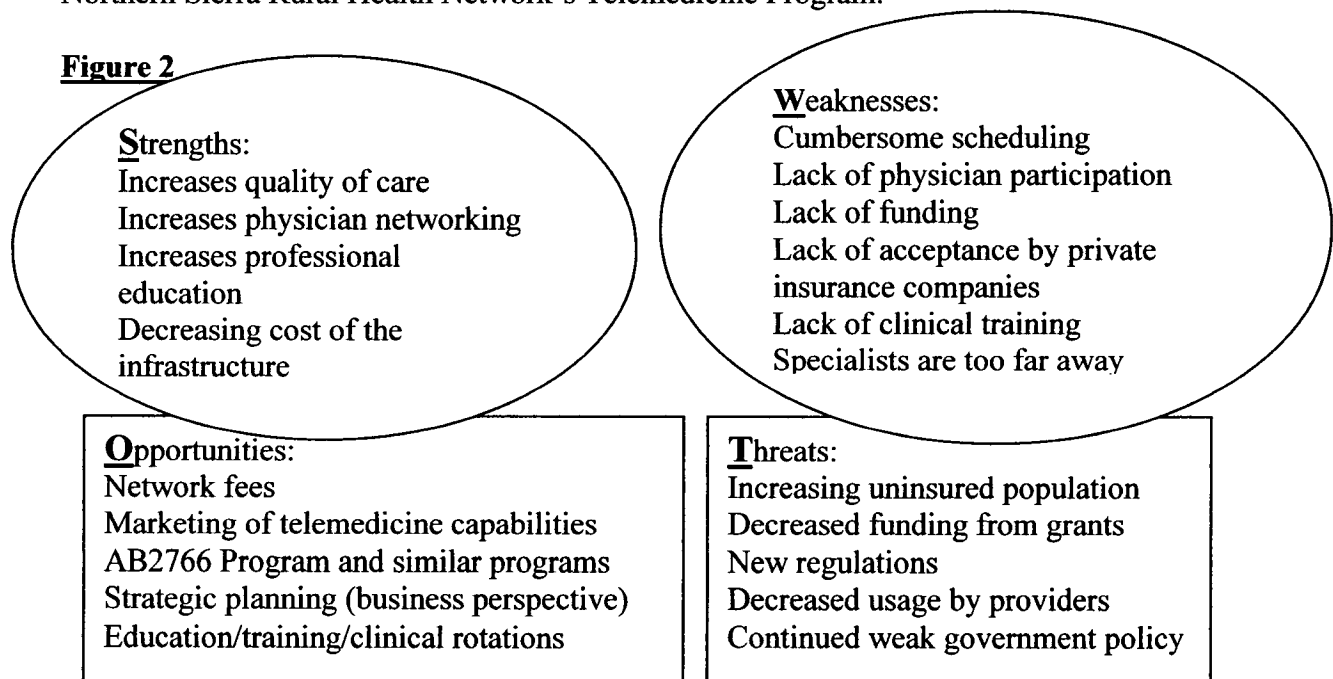
Multiple sources of data were collected; also initial key informants provided input on survey drafts, and key informants pre-reviewed interview questions prior to their interviews. Minor changes were suggested and made to the survey drafts that added clarification to questions, otherwise, no major changes were made.

Reliability is defined as, "demonstrating that the operations of a study, such as the data collections procedures, can be repeated, with the same results" (Yin, 1994, p. 9). That being said, the mission statement, purposes, and goals of Northern Sierra Rural Health Network were not included in this study because they may highlight only the purposes of the leaders of the telemedicine Northern Sierra Rural Health Network and not the telemedicine program within that network or any other telemedicine network. As noted in Classics of Organization Theory by authors Shafritz and Ott, theoretical analysis "looks at input, output, and functioning of the organization as a system and not with the rational purposes of the leaders" (Shafritz & Ott, 2001, p. 258) Instead, this study evaluated the Northern Sierra Rural Health Network's Telemedicine Program with an open-systems approach.

The open systems approach begins "by identifying and mapping the repeated cycles of input, transformation, output, and renewed input which comprise the organizational pattern" (Shafritz & Ott, 2001, p. 266). A modified application of open systems examines four crucial features of the system by identifying the strengths, weaknesses, opportunities, and threats (SWOT) and how they affect and interact with each other. The SWOT approach was used for the purposes of the scientific analysis of

this study. According to Harrison & Shirom, authors of <u>Organizational Diagnosis and Assessment: Bridging Theory and Practice</u>, by focusing on threats and opportunities, "SWOT analysis draws attention to major internal and external forces that can enhance or undermine system effectiveness...identifying system strengths and weaknesses helps pinpoint features affecting the organization's ability to respond to threats and opportunities " (1999, p. 49) Figure 2 diagrams the information gained from interviews of key informants that identifies the components of the four critical features specific to Northern Sierra Rural Health Network's Telemedicine Program.

Figure 2

Strengths:
Increases quality of care
Increases physician networking
Increases professional education
Decreasing cost of the infrastructure

Weaknesses:
Cumbersome scheduling
Lack of physician participation
Lack of funding
Lack of acceptance by private insurance companies
Lack of clinical training
Specialists are too far away

Opportunities:
Network fees
Marketing of telemedicine capabilities
AB2766 Program and similar programs
Strategic planning (business perspective)
Education/training/clinical rotations

Threats:
Increasing uninsured population
Decreased funding from grants
New regulations
Decreased usage by providers
Continued weak government policy

Key Informant Interviews:

With reference to one of the strengths of Northern Sierra Rural Health Network's Telemedicine Program having increased quality of care, an unrealized potential for helping the organization could be to increase telemedicine events in all of the spoke sites, which could minimize the threat of decreased usage by providers. The number of telemedicine events from 2003-2004 varied tremendously from site to site; Indian Valley

Health Care District in Greenville had 40 telemedicine events whereas Seneca Health Care District in Chester had only 1 telemedicine event in that same year (Appendix A). Opportunities are areas and/or situations that could be enhanced to offset threats (Harrison& Shirom, 1999). All Northern Sierra Rural Health Network program coordinators substantiated that usage of the telemedicine network is not consistent between all facilities when asked **research question #1, which asked if they thought the current program was effective.**

Since this study conducted intensive interviewing opposed to structured interviewing, research question #1 prompted conversation with interviewees and highlighted another strength noted in Figure 2, which was the decreasing cost of the telecommunications infrastructure. Three of four interviewees outside of Northern Sierra Rural Health Network noted the same thing with reference to infrastructure becoming less expensive. According to authors Harrison and Shirom, "Strengths can be thought of as current success factors—features that contribute to the organization's ability to obtain resources" (2001, p 49) Northern Sierra Rural Health Network's executive director is using this strength by applying for grant opportunities and the network currently goes through the Universal Service Administration Company (USAC), which is the administrator of Universal Service Funds (USF) that provides communities with affordable telecommunications across the country (USAC, 2005). The executive director has also applied for the AB2766 DMV funds grant, which is a program funded by vehicle license fees through Northern Sierra Air Quality Management District and grants through Blue Cross of California through a Healthy Families Rural Demonstration Grant. As

noted in the literature, developing ways of blending funding from various sources was highlighted as a strategy toward independent financial viability.

Lack of physician participation was another area of weakness that all interviewees mentioned both within the Northern Sierra Rural Health Network and the interviewees outside of the network. This was also an area that was consistently noted in the review of literature, most specifically in the study performed in Hong Kong involving 400 physicians, where the study correlated easy accessibility for the physicians with use. They also found that program administrators had to encourage the physicians to use the technology when it is first introduced and continuing to encourage through the implementation process. Lack of physician participation was also correlated with financial incentives in the literature and in interviews. Both the literature and the interviewees noted that reimbursement was poor and that was not an incentive for use. Low financial incentives would be consistent with Abraham Maslow's hierarchy of needs theory. Additionally, Maslow's theory explains the need for safety as, "a safe, orderly, predictable, organized world" (Shafritz & Hyde, 1991, p. 133) free from being confronted with unexpected, unmanageable new situations or new tasks, which complements the findings in the Hong Kong study that associated physician use with how well program administrators introduced and encouraged the use of the new technology.

Research question #2: What modifications would you like to see?

According to key informants within Northern Sierra Rural Health Network, the modifications they would like to see are:

1. For the scheduling process to be more streamlined. Currently, it is very time consuming and difficult to coordinate dates and times for the patient, the referring physician, and the consulting physician.

2. More promotion so that physician's participation, both referring and consulting, would increase. Additionally, increasing specialist participation in areas that are in closer proximity to the patient in the event that the patient has to have in-person follow-up appointment with the specialist.

3. Enrichment of internal support. Currently, spoke sites perform needs assessments and make requests to Hub. Hub sites negotiate and let Spoke site know what will be available to them.

According to key informants outside of the Northern Sierra Rural Health Network (NSRHN), yet work with NSRHN, the modifications they would like to see are:

1. Increased physician participation.

2. If reimbursement (Medical, specifically mentioned) were better, than providers would accept more patients.

Interviewees in funding agencies were asked an additional research question, which was:

Research question #3: As a funding agency, what attributes are you looking for in a telemedicine program? One of the three interviewees of funding agencies had specific attributes that they were looking for in telemedicine programs. They asked for strategic planning and explicit objectives and how those objectives would be met. The third interviewee stated that Northern Sierra Rural Health Network is an independent and effective program that partners well with their organization. The second mentioned that they were a partner with Northern Sierra Rural Health Network, and like them, were an

organization that was looking for ways to become self-sustainable and not be dependent

of grants.

Survey Results

The surveys were administered via email to all twenty-five of the Northern Sierra

Rural Health Network Telemedicine Sites. An electronic link to a survey was included in

the cover letter email and 56% of Northern Sierra Rural Health Network's Telemedicine

site coordinators completed the survey. The highest number of responses came from

hospitals (35.7%) and health centers with nurse practioners/physician assistants (35.7%).

Health centers with physicians (14.3%), telemedicine administrative centers (14.3%), and

(21.4%) indicated *other* as the type of facility where they were employed.

Survey Question # 2: What were the initial barriers to the development of the telemedicine program?

The results of this question indicated that (50%) of those surveyed felt that the most

significant barrier to the development of telemedicine was due to lack of physician

participation. This discovery compliments the literature review and findings gained from

key informant interviews. The researcher, for purposes of this study, evaluated this

finding by using the open systems approach and looked at the congruence of the internal

system components, which also encompasses the components between organizations and

their environment. According to open systems theory, both internal organizational

characteristics and external conditions have to be compatible (Harrison & Shirom, 1999,

p 52). *Reinforcement* and *Optimalization* (Harrison & Shirom, 1999, p54) are two links

to evaluate fit between system components. Reinforcement was mentioned in the

literature review as a necessary component to encourage physician participation

throughout the implementation process of telemedicine. Key informants mentioned

weaknesses that could be *optimalized* or reinforced in order to achieve a strategic

advantage, those being cumbersome scheduling and lack of clinical training.

Survey Question #3: In your opinion, what are the issues that need to be addressed or

resolved for the future of the telemedicine program?

Since the hypothesis of this paper is that *Telemedicine must be able to pay for itself in*

order to continue as an expansion of health service delivery. And the sub-hypothesis is

Telemedicine must be able to pay for itself in order to continue as an expansion of health

service delivery and financial viability is greater in telemedicine programs with

stakeholder participation. The researcher used a contingency table (True, 1989, p. 306) in

order to include the two variables as the independent, or (location of survey recipient)

variable and the dependent, or (importance choice) variable.

Figure 3: Contingency Table

Answer Choices	Hospital	Health Centers	Administration & Other
Improved third party payer reimbursement	40%	6.7%	6.6%
National, local and regional marketing of telemedicine capabilities	6.6%	6.6%	28.93%
Grant monies must continue in order to maintain the telemedicine program	6.7%	60%	28.93%
CPT code and practitioners (RN, PT, ST, OT, etc) expansion for telemedicine	6.7%	10%	28.93%
The program must eventually pay for itself.	**40%**	16.7%	6.7%
Total	100%	100%	100%

The table in Figure 3 indicates that hospital survey recipients tend to believe that telemedicine programs must eventually pay for themselves and Appendix A demonstrates that telemedicine events are greater in hospitals, thus correlating physician participation is higher in those sites within the Northern Sierra Rural Health Network's Telemedicine Program. However, (60%) of the hospitals surveyed are running at a deficit and (40%) are breaking even.

Of those surveyed, the following chart indicates the choices in order of importance of the Northern Sierra Rural Health Network Telemedicine Network as a whole:

Percent	Answer choice
29%	Improved third party payer reimbursement
21.40%	National, local and regional marketing of telemedicine capabilities
21.40%	Grant monies must continue in order to maintain the telemedicine program
14.30%	CPT code and practitioners (RN, PT, ST, OT, etc) expansion for telemedicine
14.30%	The program must eventually pay for itself.

Survey Question #4: What modification to the existing program would you like to see?

Expanding the number of specialty services provided via telemedicine was the most noted modification received by those surveyed (71.4%), including telemedicine into current organizational business and strategic plans (including third party contracts) received (21.4%) and expanding utilization to include distance education received (7.1%). Expanding the number of specialty services provided. Again, the correlation between physician and usage is brought to light. One of the weaknesses indicated by key interviewees was lack of physician participation, also mentioned was lack of clinical training. According to the open systems approach, by examining system interdependencies, " decisions makers need to anticipate the ways in which interventions or gradual changes in one part of a system are likely to affect other parts of the system" (Harrison & Shirom, 1999, p59). The interdependency between physicians getting paid

and paying for operating costs was thoroughly planned prior to implementing the Arizona Telemedicine Program as indicated in the literature.

Survey Question #5: What is the reason that affects the feasibility in providing that modification?

The survey recipients were asked to indicate the internal influences, the external influences, and other influences that affected the feasibility in providing the modification that they would like to see in their current program. All those surveyed stated that the external influences affecting the feasibility were lack of reimbursement, which correlates with survey question #12. Ninety-two percent cited that lack of interest and provider buy-in was the reason internally affecting the feasibility. Provider buy-in was an area often noted as essential in the literature. It was strongly recommended to formulate a telemedicine business plan with procedures, goals and mission as a method of ensuring a program's success. Lastly, (85.7%) noted education and marketing opportunities in order to increase patient interests. Again, supported by the literature as a way to encourage community acceptance, buy-in and participation as an integral component of stakeholder involvement.

Survey Question #6: In your opinion, can telemedicine be financially self-supporting?

According to those surveyed, (57.1%) indicated *no* to the above question and (42.9%) said *yes.*

Survey Question #7: Are there current funding programs that will lend long-term support to telemedicine?

Of those surveyed, (64.3%) said *no* and (42.9%) said *yes.*

Survey Question #8: If yes, to question #7, what are the current funding programs?

More than half of those who answered *yes* indicated what the funding programs are. The answers provided listed Universal Services and Administration Company (USAC) funding, funding through U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA) and funding through Blue Cross.

Survey Question #9: Has your telemedicine network utilized any of the following in an effort to offset costs of maintaining the infrastructure?

According to those surveyed, all of them are utilizing videoconferencing internally for professional meetings, which offers cost-saving benefits by reducing travel expenses and costs associated with having to send people out of town for meetings. A (92.9%) response indicated that college extension courses were being offered to continue education to those working in the facilities (typically nursing classes). And (85.7%) stated that the technology was used for continuing medical education (CME) for professional staff and it was used for grand rounds. However, the facilities were not charging a fee for any of the usage described above.

Survey Question #10: With reference to question #9, has this enabled you to break even, run in the black (profit), run in the red (deficit)?

The survey results indicated that (64.3%) run in the red (deficit) and (35.7%) break even.

Survey Question #11 asked: Do you have goals and objectives for your telemedicine program? Survey Question #12 asked? Are the goals and objectives on the telemedicine program being met?

| Do you have goals and objectives for your telemedicine program?	Yes = 92.9%	No = 7.1%
Are the goals and objectives of		

the telemedicine program being met?	Yes = 14.3%	No= 92.9%

One survey respondent answered both yes and no, stating that one specialty area is very successful (tele-psychiatry), whereas other specialty areas are not and thus are not meeting the goals at that facility.

Survey Question #13: If no to question #12, why?

According to the (86%) of those surveyed who answered this question, the answers revealed that (43%) felt that staff did not fully utilized the technology and (27%) felt that there needed to be more specialists available for consulting, (16%) felt that it was due to funding and reimbursement issues that the goals and objectives of the program were not being met.

Survey Question #14: What services do you feel would most contribute to economic feasibility of the current telemedicine program?
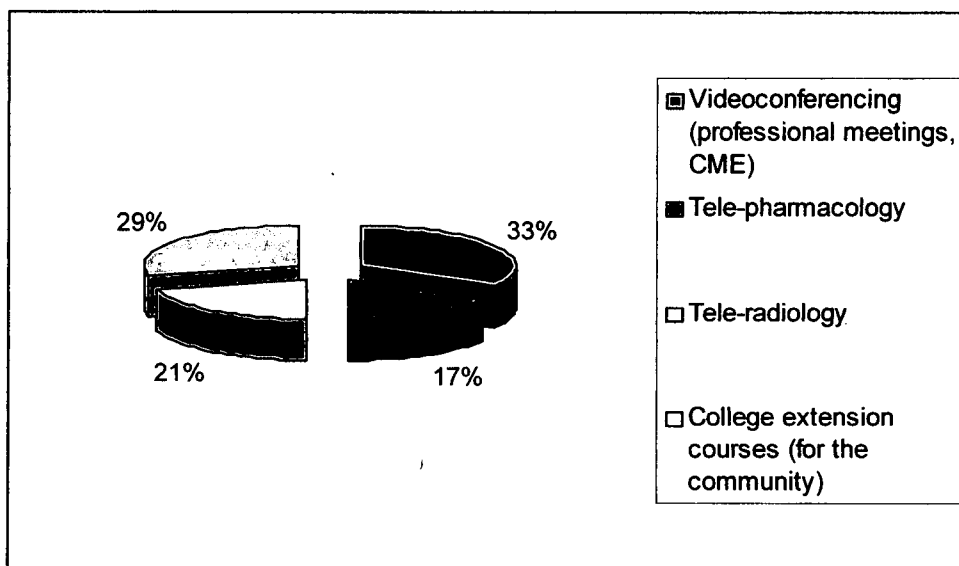
Chapter V
Summary and Conclusions

The disparity in access to healthcare in rural areas is being addressed with the use of technology. Planning the structure of a telemedicine program, or having a champion within the program or hiring a consultant to design a strategic plan builds sustainable telemedicine programs. As stated by Popovich, "No matter where you find your experts, remember two important rules of human nature. First, the plan must be owned and operated by people within the organization who have the authority to make change. And second, your best source of expertise comes from listening to people who are in the trenches doing the work each day" (Popovich, 1998, p. 90).

Northern Sierra Rural Health Network's Telemedicine Program has a wealth of expertise within its program. The findings of the survey indicated that Northern Sierra Rural Health Network's Telemedicine program goals and objectives have been established; however, the goals and objectives are not being met. The review of literature indicated that advisory oversight groups, usually composed of key players from each telemedicine site, site facilitators, both rural and urban physicians, representatives from local higher education assist in devising strategies to meet program goals.

The executive director of Northern Sierra Rural Health Network's Telemedicine Program has addressed funding strategies. Although, the Universal Services Program helps with offsetting the telecommunications costs; development and implementation of an infrastructure for multiple uses (telemedicine, distance education, professional meetings) would be optimal. According to key informant interviews, renting the equipment out to community organizations, network membership fees, a fee for

deliverables (i.e. Boy Scouts, private businesses for company meetings, distance education, CME) are funding strategies that has been successful.

According to key informant interviews, telemedicine is not currently being integrated into the training for nursing, physicians, physician's assistants, or family nurse practitioners education and/or residency programs. Additionally, existing healthcare professionals lack clinical training and would benefit from having training in-services on telemedicine. Based on the data collection, strengthening physicians' participation, both referring and consulting is vital to the telemedicine network. As is increasing internal support, including promotion of telemedicine and marketing at local, regional and national levels.

The purpose of this paper was to evaluate long-term sustainability with the primary focus on assessing the strategic planning from three separate, yet interrelated perspectives: (1) a rural provider perspective, (2) an administrative perspective, and (3) a stakeholder perspective. The open systems approach identified the organizational pattern, which included the strengths, weaknesses, opportunities and threats. The following method and policy recommendation analyzes the processes by which the organizational interaction is achieved in order to explain how systems can be viable—that is, capable of independent existence.

Cybernetics and Management: The Viable System Model

The Viable System Model is a management structure that applies the intellectual capital already existing within the Northern Sierra Rural Health Network's Telemedicine Program. It is a framework that does not parallel the formal hierarchical organizational chart. Instead, it delineates five types of managerial work (the systems) and provides methods for achieving the most synergy from the combined strengths. Figure 3 is an example of the Viable Systems Model and what the components represent.

Figure 3
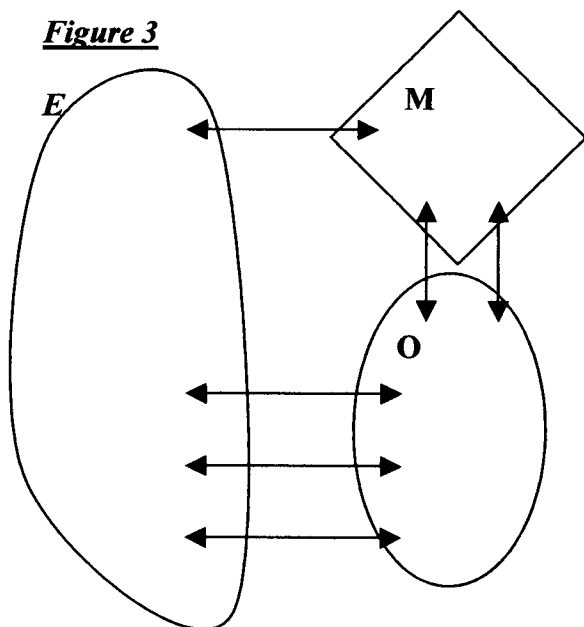
E represents the Environment

O represents the Operation (Production, distribution, earning the money)

M represents the Metasystem (Scheduling, accounts, strategic planning)

The arrows represent the various Ways the three parts interact

The following are the five systems linked with the Viable Systems Model. The various functions associated with the five systems are described then tied to the managerial work within Northern Sierra Rural Health Network's Telemedicine Program.

System 1: is a managerial function that takes into consideration the environment of customers and taking the value of customer input into account. The literature supported this area, by stating that community acceptance is imperative to whether or not a program will continue. That being said, *system 1* looks to correlate useful services to the customers. This is an area that can be addressed by the operations because the clinical staff, referring physicians, and schedulers could easily assess the climate of the environment in which each telemedicine site exists for those services that would best suit the needs of its customers. Recommendation is to perform a needs assessment of the patients and community members in order to ascertain site-specific goals and objectives that associate with the needs of the community.

System 2: is a managerial function that implements services. According to interviewees of Northern Sierra Rural Health Network's Telemedicine Program, the technology person, whose title is Telemedicine Program Coordinator, is very knowledgeable and attentive to the spoke site's needs. Recommendation would suggest that *system 2* managers identify training needs then provide their findings to human resources so they may devise training seminars for clinical and professional staff to fully and efficiently utilize the telemedicine technology. In addition, *system 2* managers should consider evaluating the weaknesses specific to technology or technology related issues and address those needs (i.e. cumbersome scheduling and changing to electronic scheduling).

System 3: is the managerial area where day-to-day decisions are made, distributions of resources are decided, and implementation of procedures determined. It is suggested that *system 3* managers be knowledgeable in contract compliance, safety regulation compliance and confidentiality protection. In addition, *system 3* managers should provide assurances that budgets are in order (Leonard, 1999). Recommendation is to appoint this position to the human resources and payroll departments, their specific expertise in the above mentioned areas could offer efficiency and cost-effective solutions to the existing network.

System 4: is a managerial function that strategically plans for the future, "a focus on the future is essential to the management of intellectual capital; the people and their perspectives must be integrated as well as the infrastructure, market knowledge and innovations in processes and products" (Leonard, 1999, p. 13). Recommendation is to have the Executive Director form an advisory group comprised of key players from funding agencies, state government, colleges, and telecommunications executives. According to interviewees, agencies may be partnered with Northern Sierra Rural Health Network; however, they work independently of each other to achieve individual goals. As an advisory group they could network together and strategically plan for future goals and objectives.

System 5: this managerial function is to look at threats and opportunities by monitoring the balance of the network, with specific attention to the balance between present and future activities so that present needs are integrated while efforts are assembled to obtain future goals. Recommendation would be to elicit more participation from all levels of

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metasystems, operation, and environment--deploy the currently untapped value of those individuals already within the system and use their intellectual resources.

Recommendations for Further Study

Recommendations for further study include: expanding the survey instrument for more in-depth case study research, fully utilize existing public administrative theory and apply viable system models and/or other models that could improve the balance of telemedicine networks to their environments.

REFERENCES

Bashshur, Rashid L. (2002). Organizational Models of Telemedicine and Regional
 Telemedicine Networks. Telemedicine Journal and e-Health (8) 61-70

Brantley, David, Laney-Cummings, Karen, Spivack, Richard. (2004). Innovation,
 Demand & Investment in Telehealth. U.S. Department of Commerce, Office of
 Technology Competitiveness, Technology Administration. [online] Available:
 http://www.technology.gov/reports/TechPolicy/Telehealth/2004Report.pdf
 Retrieved 9 April 2005

Brown, Ed. (2002). Lessons in telehealth: setting up a telemedicine program? Here are
 some pointers garnered from successful—and unsuccessful—initiatives around
 the globe. Canadian Healthcare Manager, 9 (3) 39, 41

California State Rural Health Association (2004).
     CSRHA Goes to D.C. with a Strong   Rural Health Agenda on Behalf of CA ,
 [online] Available: www.csrha.org Retrieved 11November 2004

Chen, Huey-Tsyh. (2005). Practical Program Evaluation—Assessing and Improving
 Planning, Implementation and Effectiveness California: Sage
 Publications, Inc.

Chin, Tyler L. (1998). Secrets to Success. Health Data Management,6 (7) 76-79

Conrath, D., Dunn, E., and Higgins, C. (1983). Evaluating Telecommunications
 Technology in Medicine. Dedham Massachusetts: Artech House

Economic Research Service U. S. Department of Agriculture. (2004). Measuring rurality:
 rural-urban commuting area codes [online] Available:
 http://www.ers.usda.gov/briefing/rurality/ruralurbancommutingareas/ Retrieved:
 12 December 2004

Frederickson, H. George & Smith, Kevin B. (2002). The Public Administration Theory
 Primer. United States: Westview Press

Gerston, Larry N. (2004). Public Policy Making: Process and Principles. London: M.E.
 Sharpe Inc.

Harrison, Michael & Shirom, Arie (1999). Organizational Diagnosis and Assessment:
 Bridging Theory and Practice: London: Sage Publications

Health Resources and Services Administration, United States Department of Health and
 Human Services (1998). HRSA Focuses Agency Resources on Telehealth
 [online] Available: http://newsroom.hrsa.gov/releases/oat.htm Retrieved 14
 November 2004

Hu, Paul J. & Chau, Patrick & Sheng, Olivia R. Liu & Tam, Kar Yan (1999). Examining the Technology Acceptance Model Using Physician Acceptance of Telemedicine Technology. Journal of Management Information Systems, 16 (2), 91-112

Jones, John W. (2004). Payment and other legal obstacles slow telemedicine growth. Managed Healthcare Executive, 14 (3) 53-54

Josey, Paula & Gustke, Susan (1999). How to merge telemedicine with traditional clinical practice. Nursing Management, 30 (4), 33-37

Krizner, Ken. (2002) Telemedicine still looks for inroads to total acceptability: Managed Healthcare Executive12, (5) 44-45

Leedy, Paul D. & Ormrod, Jeanne Ellis. (2005). Practical Research: Planning and Design.(Eighth Edition). New Jersey: Pearson Merril Prentice Hall

Leonard, Allenna, PhD. (1999). Journal of Knowledge Management Practice. A viable systems model: consideration of knowledge management. Available: http://www.tlainc.com Retrieved 14 May 2005

Mendelson, Daniel & Salinsky, Eileen Miller. (1997). Health Information Systems and the Role of State Government. Health Affairs, 16 (3), 106-120

Northern Sierra Rural Health Network. (2004) Telemedicine [online] Available: http://www.nsrhn.org Retrieved 14 November 2004

Office for the Advancement of Telehealth--OAT. (2001). Report to Congress on

Telemedicine [online] Available: http://telehealth.hrsa.gov/pubs/report2001/exec.htm Retrived 14 November 2004

Office of Health and the Information Highway—Health of Canada. (2002) Telehealth an Electronic Health Record: A Guide to Sustainability [online] Available: http://www.hc-sc.gc.ca/ohih-bsi/res/index_e.html Retrieved 4 February 2005

O'Sullivan, Elizabethann & Rassel, Gary & Berner, Maureen (2003). Research Methods for Public Administrators. (Fourth edition) San Francisco: Addison Wesley Longman

Popovich, Mark G. (Eds.) (1998). Creating High-Performance Government Organizations—A Publication of the Alliance for Redesigning Government. San Francisco: Jossey-Bass Publishers

Purvis, Andrew. (1992). Healing by Wire. New York Time, p. 68

Salkind, Neil. (2000). Exploring Research. (Fourth Edition). New Jersey: Prentice Hall

Shafritz, Jay M. & Hyde, Albert. (1992). Classics of Public Administration (third edition). Pacific Grove, California: Brooks/Cole Publishing Company

Shafritz, Jay M. & Ott, J. Steven (2001). Classics of Organization Theory. United States: Wadsworth Thompson Learning

Sykes, Dianne & McIntosh, William Alex (1999). Telemedicine, hospital viability, and community embeddedness: A case study: Journal of Healthcare Management,71 (13pp) Retrieved 1 Nov. 2004

Tieman, Jeff. (2000). Now getting paid for it. Modern Healthcare, 30 (43), 78, 82

True, June Audrey (1989). Finding Out: Conducting and Evaluating Social Research (Second edition). Belmont, California: Wadsworth Publishing Company

Universal Service Administration Company (2005). Rural Health Care [online] Available: http://www.rhc.universalservice.org Retrieved 30 April 2005

U.S. Census Bureau. (2004). What is Rural? [online] Available: http://www.census.gov Retrieved 14 November 2004

U.S. Department of Health and Human Services. (2004). Telehealth [online] Available: http://telehealth.hrsa.gov Retrieved 14 November 2004

Wootten, Richard. (1996). Telemedicine: A Cautious Welcome. British Medical Journal, 313 (7069) 1375-1378

APPENDEX A

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Northern Sierra Rural Health Network

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530-72

Telemedicine Site	WIREONE Equipment Warranty Expiration Date	# TM EVENTS 2003 - 2004					
Banner Lassen Medical Center	6/30/2006	0					
Big Valley Medical Center	**6/30/2007**	21					
Burney Health Center	UCD	4					
Butte Valley Medical Center	6/30/2006	0					
Canby Family Practice	6/30/2006	22					
Center for Accessible Technology	12/30/2006	0					
Corning Medical Associates		11					
Far Northern Regional Center							
Happy Camp Karuk Tribal Clinic	**6/30/2007**	new					
Hill Country Community Clinic	6/30/2006	28					
Indian Valley Health Care District	**6/30/2007**	40					
Karuk Tribal Clinic	6/30/2006						

Mayers Memorial Hospital	**6/30/06**	176				
McCloud Healthcare Clinic	**6/30/2007**	new				

Telemedicine Site						
Miners Community Medical Clinic	6/30/2006	5				
Modoc Medical Center	6/30/2006	6				
Mt. Shasta Medical Clinic	**6/30/2007**	10				
Northeastern Rural Health Clinic	6/30/2006	4				
Plumas County Health Services	**6/30/2007**					
Plumas District Hospital	6/30/2006	144				
Seneca Health Care District	**6/30/2007**	1				
Shasta Community Health Services	6/30/2006	401				
Shingletown Medical Center	**6/30/2006**	7				
Sierra Family Medical Center	**6/30/2006**					
Siskiyou Family Healthcare, Inc	**6/30/2007**					
Southern Trinity Health Services						
Surprise Valley Health Care District	**6/30/2007**	2				
Tahoe Forest Hospital Clinic	**6/30/2007**					
Trinity Hospital	6/30/2006	10				
Western Sierra Medical Clinic	6/30/2006					

Gantt Chart APPENDIX B

TASK	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05
Select a topic								
Develop a hypothesis, identify independent and dependent variables. Operationalize definitions, gather and review secondary data.								
Develop surveys, write introduction for research proposal.								
Continue secondary research								
Make initial contact with Doctors Loesch, Dawkins and Executive Director of Northern Sierra Rural Health Network. Determine what target groups will be contacted in the eight county rural areas.								
Contact target groups, which included: rural telemedicine coordinators, physicians who have telemedicine capabilities, and stakeholders in NSRH telemedicine network— conduct surveys and analyze data								
Check for internal validity								
Check for external validity								
Verify hypothesis and write Capstone project.								
Submit paper								

VITA

Corinne Ann Bruce was born and originally from Woodside, California, a rural area within the Bay Area, currently residing in Nevada City, which is a rural town in northeastern California. She graduated from Nevada Union High School and attended Sierra Community College with concentration in nursing. She graduated from University of San Francisco, and, in 2001, received a Bachelor of Science in organizational behaviour. She is currently pursuing a master in public administration from Golden Gate University.

If you build it, they will come
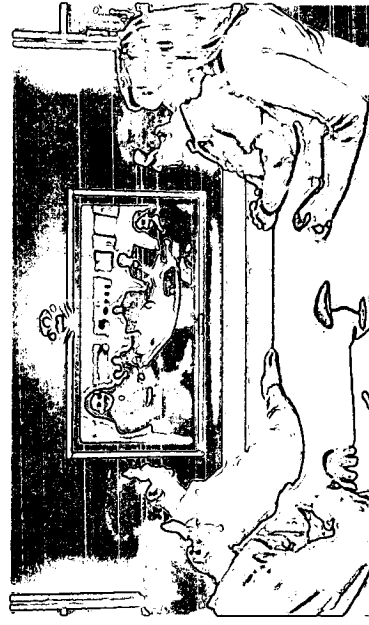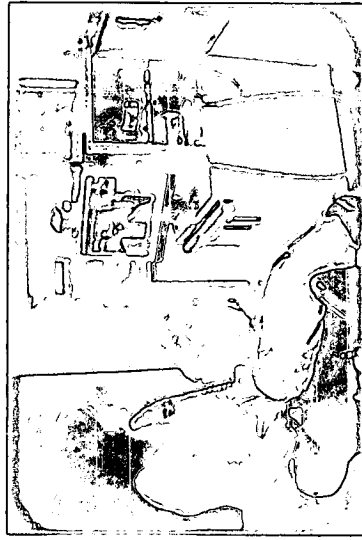
RURAL CALIFORNIA AND THE EXPANSION OF HEALTH SERVICE DELIVERY:

A PROPOSAL TO EVALUATE THE LONG-TERM SUSTAINABILITY OF NORTHERN SIERRA RURAL HEALTH NETWORK'S TELEMEDICINE PROGRAM

Corinne Bruce

What is a telemedicine program?

□ There is not an universally accepted definition of telemedicine, though many forms of telemedicine have been practiced for over thirty years.

□ The word itself is derived from the Greek word *Tele*, which means far off and the Latin word *medicus*, which means physician, thus a literal definition would be *physicians practicing medicine from a distance*.

□ Telemedicine applications can range from high-resolutions still images, such as x-rays being transmitted to a radiologist in another town to sophisticated video teleconferencing systems allowing a rural patient to have a consult with an urban specialist.

□ In rural and remote areas, where the distance between a patient and health professional can be hundreds of miles, telemedicine can mean access to health care that a patient would not otherwise have.

Telemedicine Background

- The Balanced Budget Act of 1997 marked a noteworthy change in Medicare payment policies, which opened the door for telemedicine reimbursement.

- Little research has been done on the most effective ways to create self-sufficient telemedicine programs.

- Inadequate funding and reimbursement issues will continue to negatively impact existing telemedicine programs.

- The needs for telemedicine in rural and medically underserved areas still exist despite multiple federal funding programs since the 1960's.

Methodology

- Both qualitative and quantitative methodologies were used to capture the history and outcomes of the Northern Sierra Rural Health Network.

- Qualitative tools included multiple key informant interviews and a comprehensive review of source documents.

- Quantitative approaches include analysis of surveys that targeted rural health providers and administrative stakeholders of the Northern Sierra Rural Health Network health organization.

Hypothesis

Hypothesis: Telemedicine must be able to pay for itself in order to continue as an expansion of healthcare delivery.

(Sub-Hypothesis) and financial viability is greater in telemedicine programs with stakeholder participation

Open Systems Approach
Used to Analyze Telemedicine Program Elements

Strengths:
- Increases quality of care
- Increases physician networking
- Increases professional education
- Decreasing cost of the infrastructure

Opportunities:
- Network fees
- AB2766 Program and similar programs
- Marketing of telemedicine capabilities
- Strategic planning (business perspective)
- Education/training/clinical rotations

Weaknesses:
- Cumbersome scheduling
- Lack of physician participation
- Lack of funding
- Lack of acceptance by private insurance companies.
- Lack of clinical training
- Specialists are too far away

Threats:
- Increasing uninsured population
- Decreased funding from grants
- Decreased usage by providers
- Continued weak government policy
- New regulations

Results and Findings

64.3% of sights are running at a deficit

35.7% are breaking even as a result of the following:

1. Scheduling process needs to be more streamlined

2. Increase physician's participation, both referring and consulting

3. Internal support needs to include strategic planning and funding strategies
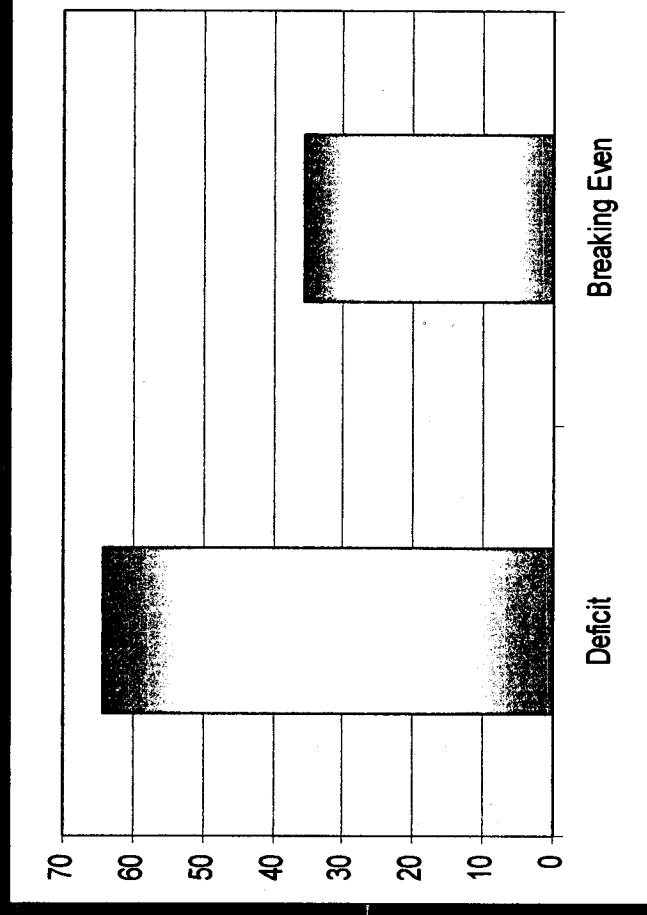
Conclusion

- Telemedicine must be able to pay for itself in order to continue as an expansion of healthcare delivery.
  - Literature and survey data is supported because grant money being discontinued and telemedicine programs have not implemented strategic planning or funding structure to be self-sufficient.

Viable*System Model
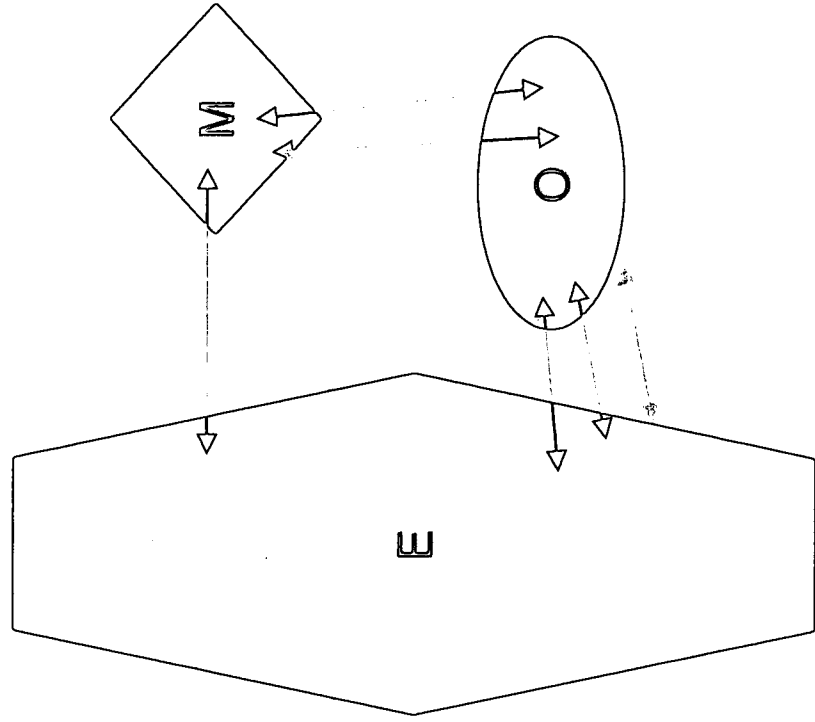
E represents the Environment

O represents the Operation (Production, distribution, earning the money)

M represents the Metasystem (Scheduling, accounts, strategic planning)

The arrows represent the various Ways the three parts interact

M

O

E

Program Recommendations

- Perform a needs assessment of the patients and community members

- Identify training needs

- Evaluate weaknesses specific to technology

- Appoint a budget analyst

- Form an advisory group comprised of key players from funding agencies, state government, colleges, and telecommunications executive's.

  – network together and strategically plan for future goals and objectives.