

Telemedicine as a Substitute for an Outreach Clinic

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This paper addresses the potential role of telemedicine in a specialty medical clinic—cardiology. A model was developed focusing on the individual level of analysis of the cost associated with a specific clinical activity. This model is further illustrated through its application in evaluating the substitution of telemedicine for a cardiologist visit to a rural outreach clinic.

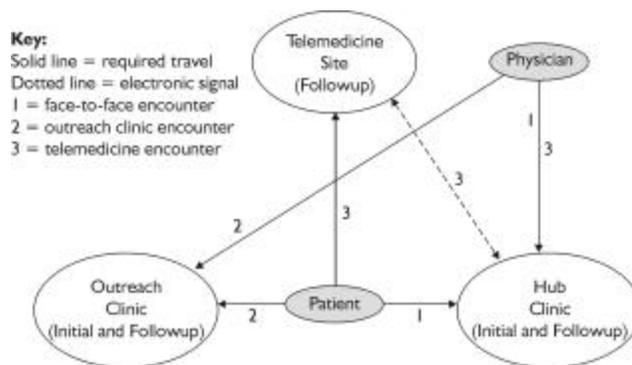
Cardiology was selected because it is the second most common clinical specialty in which telemedicine has been applied¹. An overview of the rural applications of telemedicine, surveying 2,363 non-Federal, non-MSA hospitals in the United States, found that more than 43 percent of facilities had attempted some form of telecardiology at least once. Studies examining the feasibility of telecardiology compared with traditional methods have found telemedicine to be an effective alternative for correlating the presence or absence of symptoms with pacemaker dysfunction or dysrhythmias², for the diagnosis of congenital heart defects in neonates³, for detecting arrhythmias associated with infrequent symptoms⁴, and to provide accurate emergency consultative echocardiographs 24 hours per day⁵.

The cardiologist selected was comfortable with telemedicine and had developed a routine for its use in his practice, although only for followup visits. An outreach clinic was chosen from a rural Missouri community located 90 miles from the specialist at the hub clinic.

The initial step was to identify the options available for the provision of cardiology services. The specialist physician can function in three different sites for service

delivery and may utilize alternative means of delivering specific

Figure 1. Telemedicine, Outreach Clinic, and Hub Forms of Patient-Physician Interaction



health services. Similarly, the patient can obtain services from three locations. Figure 1 provides an example of three forms (nodes or locations) of patient-physician interaction that could occur.

The first node is referred to as the “hub clinic.” The hub facility represents the physician’s primary clinic of practice. When the patient-physician interaction takes place at this node, the patient must travel, often extensively, to the hub, while the physician experiences only his or her usual commute to work. The arrows labeled with a “1” in Figure 1 denote this. Interactions of this node take the form of both initial visits and followup encounters.

The second possible point of interaction between the physician and patient can occur at the outreach clinic. The arrows labeled “2” in Figure 1 indicate that both the physician and patient travel to that geographic location for a face-to-face encounter. As a rule, the physician typically travels a greater distance than the patient. This occurs because most

outreach clinics are located in rural communities to extend services to patients in underserved rural areas. The outreach clinic is also the site of both initial and followup visits. Physicians have demonstrated a willingness to travel to these communities for a variety of reasons, including improved access to the local community and increased marketing of services, resulting in increased market share⁶.

The third site of interaction is the telemedicine site. In this study, telemedicine encounters were used only for followup visits. As denoted by the solid arrows labeled “3” in Figure 1, the patient travels to the telemedicine site (which was located in the outreach community, thus minimizing travel), while the physician stays in the hub facility where the telemedicine equipment was located (also minimizing travel).

The dotted double-arrow line labeled “3” in Figure 1 indicates the communication that takes place via the telecommunications equipment. This communication can take a variety of forms, including audio, video, radiography, and so forth.

In assessing the financial implications, a generic method was developed to allow different clinics, different specialties, and different communities to be examined. Cost variables included in this example of the model were production, compensation, salary, ratio of compensation to production, encounters per year, patient contact percentage, average hours worked per week, patient contact hours per week and day, average weeks worked per year, total hours of patient contact per year, total work hours per year, time spent per patient, patients seen per hour, production per visit, compensation per visit, production per hour, compensation per hour (contact), and compensation per hour (total). These variables were evaluated on noninvasive and invasive cardiology bases, when possible. Other variables relating to the travel of the physician were

incorporated to provide an accurate account of the travel costs that would be eliminated through the utilization of telemedicine. This model was developed to be very flexible. That is, it was designed so that any specialty could be explored, as well as any geographic location.

In this study, it was found that the opportunity costs associated with not using telemedicine were \$2,301 in additional revenue for each day traveled. In terms of the applied example, where the physician was salaried and assumed to be fully utilized by the organization, a cost impact of \$2,301 for 1 physician for 1 day is fairly substantial, especially in today’s environment of tightening medical reimbursement. No attempts were made to determine how many days’ worth of visits could be avoided through the use of telemedicine. However, if 10 days of travel are avoided, the difference is enough to hire a full-time clerical staff; if 20 days are avoided, an additional registered nurse could be hired. It is obvious from the numbers that the use of telemedicine as a substitute for the outreach clinic has financial advantages.

Outreach clinics also provide an advantage to the patients by increasing access. This is also advantageous to the hub clinic, in expanding market share, and to some extent, in serving as a feeder for the hub hospital. Consideration must be given to the extent to which outreach clinics provide services to individuals who would not otherwise receive those services, would not make the trip to the hub, might receive delayed diagnosis, or might experience an avoidable traumatic experience.

In this case, it appears that there is substantial financial advantage for the hub to substitute telemedicine rather than send a specialist to the outreach clinic. Additional research is needed to quantify the value to the outreach site, the patient, the communities in which the equipment is located, and society.

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