Several compelling reasons for the growth of telemedicine are present, including the following: widening access to health care; cost containment of the increasing expense of health care with a growing elderly population; and geographic gaps in medical care access between well-served and disadvantaged areas. How does telemedicine promote health and help resolve these issues? Access to care is the most easily measured and directly observable of telemedicine’s benefits. While nearly one-quarter of Americans live in rural areas, only 9 percent of physicians practice in these areas, according to the National Rural Health Association.1 Thanks to telemedicine, availability of specialists and primary care is enhanced for a patient living a great distance from medical centers. Additionally, the need for patients to travel is also reduced. Studies have demonstrated that waiting times are also shortened by telemedicine. For instance, formerly in one state a visiting pediatric cardiologist service was monthly, whereas a teleconsult could be performed within two days.2

Cost containment is more difficult to measure, as technology itself is a major cause of the rising cost of health care. Proponents of telemedicine, however, argue that telehealth can help contain costs by providing specialty care at local health facilities by remote video monitoring. It may diminish the need to transport patients to other health care facilities or reduce the need for specialists to travel to remote locations without reducing the quality of care. The literature on telehealth is extensive; however, there are few analyses of the economic benefit, given the difficulty of accurately analyzing the cost savings.

This cost-effectiveness is challenging to measure in part because of the service being evaluated, its competitor (traditional medical visits), the type of economic analyses, and the patient groups. One recent literature review study examined the different modalities of telehealth and found overall that telehealth represented a cost savings. Specifically, they found that 61 percent of studies revealed telehealth modalities to

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be less expensive than traditional medicine delivered in person across home health, specialist on-call to hospital, specialist consultation to primary care, or rural inpatient/outpatient care. Other studies have indicated that there is no conclusive evidence of the cost savings of telemedicine compared to conventional care. Given the ambiguity, no definitive conclusions can be made, and further research into the cost savings of telemedicine must be undertaken before more physicians and hospitals embrace it.

Is Telemedicine Clinically Effective?
Effectiveness can be measured in multiple ways in medicine: patient satisfaction, patient quality of life, concordance of diagnosis, management reliability/accuracy, and patient outcome. Telemedicine makes the task of assessing effectiveness even more difficult as it encompasses various modalities and specialties. Overall, studies have shown a paucity of sound research and limited numbers of randomized clinical trials, the gold standard in providing definitive evidence about clinical outcomes. Nonetheless, several studies will be referenced below.

A literature review assessing the clinical outcomes associated with telemedicine across variable measures and specialties found support for telemedicine. According to this study on diagnosis, of 160 total studies (80 in live mode and 80 in asynchronous mode), 69 percent were rated as supportive of telemedicine, where the results and the study designs revealed the merit of telemedicine as a viable stand-in for conventional care. By specialty, for telepathology, of 33 studies, 26 were found to be supportive based more on store-and-forward applications; in teleradiology, 93 percent were found to be supportive, analyzed according to general skin lesions vs.

pигmented lesions; for teleradiology, the vast majority were supportive.

In telecardiology, 10 out of 14 studies were found to be supportive, and these were mainly in the synchronous mode examining echocardiograms that showed no difference between live video and in-person, stethoscope examinations, with three studies showing mixed results with accuracy higher among experienced cardiologists and electrocardiograms demonstrating high accuracy, specificity, and sensitivity. In teleophthalmology, 12 studies were examined, of which six were inconclusive, focusing on a split lamp exam showing 5 percent of studies with significant difference in diagnosis; ophthalmoscope studies that showed diagnostic concordance of 85 percent though dropping for emergent cases to 40 percent, and also revealing good agreement for the conditions of glaucoma and retinopathy. In the sphere of telemental health, five out of eight studies were supportive of telemedicine, all in synchronous mode. Finally, for home applications, four out of nine studies were supportive, especially in the area of vitals monitoring.

With regard to patient satisfaction, a less cumbersome criterion to measure, most studies indicate patients are generally pleased with telemedicine. One systematic review of studies on patient satisfaction revealed that while numerous papers have been published, most are superficial and indicate a positive response from patients. They conclude that further studies need to examine the type of consultation that is most appropriate, the impact on doctor-patient relationships, and the limits of telemedicine.

While most comparative studies to date have focused on patient satisfaction and diagnostic accuracy, few have examined clinical management and outcomes. Teleradiology appears to be the most well studied and accurate in diagnosis. Among specialties with both diagnostic and clinical management data, dermatology leads the way. Interestingly, home-based applications for chronic diseases like diabetes, congestive heart failure, and blood pressure carry the most impact for clinical outcomes based on the data. This study also examined the effectiveness of telemedicine and found that 33 percent of studies examined in a literature review showed improved health outcomes, 58 percent found health outcomes not significantly different, and 9 percent were either less effective or differed according to patient group. As evidenced by these results, there is a need for further research to define the benefit and outcome associated with each branch and the modality for it to be embraced by the health care system.

Note
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Endnotes

2. V. Wade et al., A Systematic Review of Economic Analyses of Telehealth Services Using Real Time Video Communications, 10 BMC Health Services Res. 1–13 (2010).


7. Heinzelmann, supra note 5.

8. Wade, supra note 2.