

Economic Analysis of Primary Care Telehealth in the United States

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Abstract

Telemedicine is a growing field in healthcare which has become widespread with easily accessible technology. Nurse practitioner utilization in telehealth has expanded in the last decade and is a cost-effective solution to providing affordable primary care, particularly for rural and underserved populations. Telehealth can be performed on a local or national scale, and for a variety of needs. In an economic analysis, market efficiency, redistribution, marginal analysis, supply and demand, scarcity and choice, opportunity cost, markets and pricing, competition, and market failure are examined. The nurse leader must understand these variables from a provider, patient, and societal perspective to make educated decisions in healthcare and business. Individual setting, pre-existing electronic health records, and reimbursement models significantly affect the market and growth in this sector. Telemedicine technologies impact healthcare workforce education, and leaders with an astute understanding of how to match resources to population needs will thrive in this growing market.

Keywords: telehealth, telemedicine, primary care, economics, nursing leadership

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Telemedicine is changing how healthcare is delivered, with advancements driven by improvements in technology, the need for efficiency, a national desire to lower healthcare costs, and the ability to serve a complex set of needs. In outpatient settings, telehealth is utilized to perform nonemergent care, patient education, metric monitoring, rehabilitation, mental health services, and chronic disease management (Albright, 2017; Terry, 2017). In this sense, telemedicine is described as interactive video consults between patients and healthcare providers. These duties are increasingly being fulfilled by nurse practitioners (NPs), who are well-equipped to diagnose, prescribe, and intervene in the primary setting (Kippenbrock, 2017; Reed, 2005). Primary telehealth has shifted to being provided by NPs and physician assistants as a cost-effective solution to expanding accessibility (Albright, 2017). These providers cost organizations less than physicians and provide services with equal stewardship and patient outcomes (Kippenbrock, 2017; Dower & O'Neil, 2011). States are increasing scope of practice for NPs to match education and clinical ability, and NPs are becoming the primary source of care for many rural and underserved communities, which are shown to have poorer health outcomes without healthcare access (McPhee, 2014; Ying et al., 2018). Telehealth is a resource commonly used to reach these patients who face challenges accessing primary healthcare and in turn utilize inappropriate sources at a higher rate and who are sicker upon assessment (National Conference of State Legislatures [NCSL], 2017; Penner, 2017).

Background

Telehealth is valued due to its efficiency in meeting needs and its ability to eliminate costly parts of a provider visit in office supplies, ancillary staff, expensive billing, mileage, and wait time. The indirect costs of most patient care are oft discarded in cost analyses of telehealth services, resulting in approximately a 50% profit per visit (Beck, 2016; Penner, 2017).

Telemedicine service has become a cost-effective and efficient platform for patient care due to declines in technology prices and an increase in use by the U.S. population (Lievens & Jordanova, 2004). Once a telehealth service is established, an online source for sign-ups, a few personnel, and a small monthly fee are all that is required of a small provider to fit virtual patients into a clinical schedule (Terry, 2017). For some, outsourcing to a large national telehealth company is a viable way to ensure community health and access to care is upheld. Distribution of telehealth has expanded rapidly in recent years; 75% of large employers offered virtual provider visits as an employee benefit in 2016 (Beck, 2016). Insurance and technology advancements are the greatest limiting factors for redistribution.

Practice laws are allowing physicians to perform services across state lines, and recent enactments via the enhanced nurse licensure compact has made it easier for NPs to perform telemedicine (Finnegan, 2018; Ying et al., 2018). Marginal analysis shows telehealth has the means to meet public need, but that the cost may need to be reduced or insurance coverage expanded for greater market growth (Beck, 2016). Further savings are found when this resource is used over unnecessary emergency medicine (Walker, 2017). The supply outweighs use, as many telehealth services report slow but steady growth (Lee, 2015; Siwicki, 2018). Demand is there, but several barriers exist; this is expected to change in the next decade. The low cost of rented applications and technology services ensure providers are not taking big losses when virtual visits are down (Beck, 2016). The opportunity cost varies per perspective, and pricing is relatively uniform across modalities. Competition is increasing but the low cost of buy-in for providers with pre-existing electronic health records (EHRs) makes the market easily penetrable. Perceived market failures are being readily corrected by regulating bodies and an uncoordinated push for insurance coverage, which once enacted will change the majority fee-for-service reimbursement model (Lee, 2015).

Analysis

Market Efficiency and Redistribution

The value of a market is affected by its efficiency level (Lee, 2015). The most efficient market pairs production with consumption, and producers to consumers who value it most. Innovation is valued and rewarded. When telehealth is available but not consumed, very little production is lost because providers see virtual patients quickly for less complex needs, and the provider uses the alternative time to complete in-office visits (Beck, 2016). Telemedicine software platforms are inexpensive, and the most popular applications cost \$20 to \$50 per month regardless of usage (Agnisarman et al., 2017). The availability of HIPAA-compliant, affordable, and competing platforms reduces the likelihood of monopolies on telehealth from occurring. Efficiency is found when providers utilize effective scheduling practices, use low-cost providers such as NPs, and use otherwise unbillable time to complete virtual visits (Albright, 2017). Terry (2017) quoted a cardiologist who stated, “I can take consults while driving in the car with my wife; I can take them while sitting home watching a football game. It’s very convenient for the provider” (p. 24). Less time is needed to provide the service because the user performs more of the preliminary data entry (Beck, 2016). Due to slow growth, providers are reporting that telehealth is not detracting from other business (Lievens & Jordanova, 2004).

Marginal Analysis

An input view emphasizes the contributions of telehealth on overall public well-being (Lee, 2015). The utilization of telehealth reduces nonemergent use of emergency rooms, saving the U.S. economy millions of dollars in unnecessary hospital costs (Terry, 2017; Walker, 2017; Weinick, Burns, & Mehrotra, 2010). Ashwood, Mehrotra, Cowling, and Uscher-Pines (2017) found that telehealth utilization was used to replace a face-to-face visit 12% of the time, and the other 88% was new utilization of care. This indicates better outcomes for patients who otherwise

would have gone unseen by a provider but also an increase in healthcare costs for insurance companies on primary and urgent respiratory complaints. Timely healthcare delivery reduces barriers to care, but setting a value on emotional and social impact per individual by eliminating remoteness is not feasible (McPhee, 2014).

Many patients who desire virtual services are unaware of its availability, and only 15% of primary care providers offer telemedicine (Beck, 2016; Muir, 2014). When patients choose alternatives to telehealth, cost can become a factor. An increase in marketing of virtual clinics would bring in greater patient panels (Walker, 2017). When a \$45 visit brings a provider 50% revenue, but fewer patients can afford \$45 out of pocket, a reduction in price would lead to an increase in utilization and overall profit (Lee, 2015). Virtual patients are more likely to choose the same provider for other services in the future; therefore, inclusion of telehealth is a form of marketing (Walker, 2017).

The ability to acquire an otherwise noncompliant patient population is an additional benefit. Some patients would otherwise have foregone medical care, worsening their problem and resulting in more expensive issues in the future in terms of medical care and disability (Terry, 2017). On a large scale, fewer unmet needs will progress to acute and costly stages (Lee, 2015).

Minetaki, Akematsu, and Tsuji (2011) studied many variables and found the greatest savings in outpatient telecare to be less travel expenses for clients and the prevention of worsening symptoms. Access to telehealth leads to a reduction in work call-outs and lost productivity (McPhee, 2014; NCSL, 2017). Telemedicine allows a patient to wait for the scheduled visit in their own environment, which is offset by an increased user workload (Terry, 2017). The patient must often document symptoms and medical history in advance and may need to file a claim to their insurance company after the visit. Holmner, Ebi, Lazuardi, and

Nilsson (2014) identified reduced carbon emissions as a reduced societal cost. Bounthavong et al. (2018) found the cost of telebehavioral health tripled if a patient did not previously possess video-conferencing technology and a home computer before beginning telehealth home treatment, but that cost was reduced by approximately 5% if the patient already owned the necessary equipment.

Supply and Demand

For primary and non-emergent healthcare needs not requiring lab work and cultures, telehealth is a satisfactory substitute that costs less to produce. Telehealth as a market is increasing the overall healthcare supply and access in the United States (Beck, 2016). Many needs are being met for patients with diabetes and heart conditions, chronic illness, mental and behavioral health, illicit substance and tobacco use, and primary or urgent care needs (Flaum, 2013; Hope Kolltveit et al., 2017; Lu, Chi, & Chen, 2014; Raths, 2018). When the average household income rises too slowly to match increases in cost of living, consumers become more sensitive to price changes (Guzman, 2017; Penner, 2017). As insurance picks up telehealth costs, consumers will become less sensitive to inevitable increases in price and will be likely to use these services more frequently (Beck, 2016; Penner, 2017). Eventually, spending will grow due to a volume increase, and the price will further increase to include the cost of additional billing and coding procedures (Lee, 2015). When considered in terms of populations that need primary healthcare but lack access, this market has not met all the demand that exists. Most providers do not see telehealth requiring a significant portion of their time within the next three to five years, and do not anticipate needing to hire additional staff to meet demand (Beck, 2016; Terry, 2017).

Scarcity and Choice

Improvements in computer security, reductions in technology prices, and slow growth are positive factors for market buy-in (Lievens & Jordanova, 2004). Start-up costs are only high if a pre-existing EHR is not in place, and over 60% of office-based providers already use EHRs (Grube, Kaufman, Clarin, & O’Riordan, 2016; Office of the National Coordinator for Health Information Technology, 2016). This easy-to-establish corner of the market is expanding slowly enough to attract otherwise hesitant players, and large organizations have a desire to establish virtual clinics now for what is viewed as a promising future (Beck, 2016; Powell, Henstenburg, Cooper, Hollander, & Rising, 2017; Siwicki, 2018). The expansion of nurse practice acts is allowing NPs to fill telehealth roles to meet rural and underserved community needs more readily (Kippenbrock, 2017).

Penner (2017) stated that scarce resources must be allocated efficiently. Market equilibrium has not yet been reached, as not all consumers who value telehealth have accessed it. This is due to a lack of knowledge about available resources, apprehension about software security, and for some, \$45 for a virtual visit remains too costly (Beck, 2016; Siwicki, 2018). For others with no insurance coverage or with a high deductible plan, paying \$45 out of pocket is reasonable when compared with the full price of an urgent clinic visit. Telehealth participation for a client can require expensive resources, limiting choice (Bounthavong et al., 2018). Studies found that minority use of telemedicine and inclusion in telehealth research was disproportionate to population ratios, suggesting room for improvement (James, Harville, Sears, Efunbumi, & Bondoc, 2017).

Although more than 75% of large employer organizations are offering telemedicine as a benefit, only 15% of family physicians offer it in practice (Beck, 2016). This is almost entirely due to a lack of insurance reimbursement (Beck, 2016; Muir, 2014). The internet-based structure of telehealth also means that when local providers do not offer telehealth, national sources can

fill the void. Dependable internet connectivity and satellite or mobile technology becomes the limiting factor for most rural U.S. residents.

Opportunity Cost

The opportunity cost of telehealth depends on the nature of its use and the volume of input (Lee, 2015). The trade-off value is calculated, but the outcome may differ per variable studied (Penner, 2017). In some specialties, consultants realize a loss in profit when the time used is compared to an in-clinic visit. Fuertes-Guiró and Girabent-Farrés (2017) found that for teledermatology, consultant time cost an additional \$35 per minute for telehealth, and that telecare required an average of seven minutes more than a physical visit. Muir (2014) found the time disadvantage was overcome by the ability to access more patients overall, and stated that follow-up dermatology care was where the long-term opportunity cost savings were realized. Other studies also found similar increases in opportunity cost of consulting time versus physical consults (de la Torre, Hernandez-Rodriguez, & Garcia, 2004). In ophthalmology, telehealth has an edge, providing patients with increased quality-adjusted life years (QALYs) for nearly half the provider cost of a standard visit (Dávalos, French, Burdick, & Simmons, 2009). Beck (2016) demonstrated that in primary telehealth and cardiology specialties, telehealth proved to be the winner in lower cost and increased profit per visit comparisons. The variables of wages, office overhead, technology, training, and repair vary; therefore, opportunity costs differ from program to program and between specialties.

Market and Pricing

Telemedicine providers who run virtual clinics frequently do so as a fee for service due to Medicare insurance constraints. Most providers charge \$40 to \$50 for a virtual visit of primary, specialty, and urgent care nature, which is efficient when compared to the average of \$100 for an in-person visit, \$160 for urgent care, and more than \$750 for an emergency room visit (Beck,

2016). The net profit is typically \$25 per visit after accounting for the cost of service provision and provider time (Terry, 2017). When the service is reimbursed by insurance, the coverage varies from state to state and health plan to health plan (Beck 2016). Thirty-two states now require private insurers and Medicaid to pay for telemedicine (Beck, 2016; Center for Connected Health Policy [CCHP], 2017; Terry, 2017). The market size varies widely depending on an organization's definition of telemedicine (American Telemedicine Association [ATA], n.d.). The consensus among all providers is that the market is growing slowly and steadily, although only between 1% and 2% of outpatient visits consist of online or video consultations (Terry, 2017). Expansion of telemedicine use in most settings averages 20% growth annually, but this segment of the healthcare market remains small in comparison with total outpatient care (Beck, 2016).

At present, some services are covered by Medicare such as remote patient monitoring and videoconferencing, billable as "physician services" (ATA, n.d., p. 9). Medicare only covers rural areas when the telehealth provided is in conjunction with a service performed at a hospital, provider's office, or clinic (Beck, 2016). Medicaid covers a wider variety of telehealth services, but with variability in details by state, and 36 states have laws requiring coverage by private insurers (CCHP, 2017; NCSL, 2017).

Competition

Some smaller and private practices lack infrastructure for telemedicine, so telecare is contracted out to larger businesses (Terry, 2017). These services are typically provided through large national organizations that do not have access to full patient records. This raises concerns for thoroughness, safety, and security of information. More technology companies are providing platforms that enable private practices to provide personal virtual visits with their own patient panels. This increases competition between providers (Lievens & Jordanova, 2004).

Shortages in providers have an impact on primary telemedicine. Although a visit requires seven to 15 minutes, the provider must be able to fit the patient into an existing schedule of in-person appointments (Terry, 2017). As insurance rules change to include more telemedicine coverage, regulations on practice will be enacted. This may become an additional barrier to providers hoping to participate in the market (Lee, 2015). Government regulation has advantages, including protections for provider and patient, increased market power, and reduced market failure.

Market Failure

Quality and safety in telehealth are vital issues (McPhee, 2014). Consumers have increasing expectations of high levels and accessibility to healthcare, driving this market (Lievens & Jordanova, 2004). As a result, quality concerns increase. One response to potential market failure is regulation (Lee, 2015). Accreditation of virtual clinics is a newly emerging model, tasked with standardizing quality, setting ethical guidelines and security mandates, setting limitations to reduce liability, and reducing the likelihood of patients falling victim to online virtual provider scams (Terry, 2017). Malpractice rates for telemedicine providers have not been raised.

Discussion & Limitations

Telemedicine is promising for business development and reaching a variety of consumers (Lievens & Jordanova, 2004). Nursing leaders must understand the limitations of generalizability in economic evaluation due to differing conclusions based on specialty (Dávalos et al., 2009). An approach that analyzes silo perspectives of opportunity costs in telehealth is less beneficial. Nursing leaders must assemble a more complete picture of provider, patient, and societal benefit. Four stakeholder groups exist: citizens, professionals, employees of large organizations, and insurance companies (Lievens & Jordanova, 2004). The market and its

individual EHRs are as fragmented as other healthcare sources despite being built upon similar technologies (McPhee, 2014). Empowering nurse leaders to develop and promote policy that improves communication between providers and EHRs will further increase efficiency in healthcare. With duration in use, telehealth can reduce overall outpatient medical expenses and disease burden for patients (Minetaki et al., 2011).

Healthcare organizations use telemedicine to build markets for their providers. New patients are enticed by the ease of a virtual visit for a quick or uncomplicated need, and then utilize that organization for their primary care provider and lab testing (Terry, 2017). Nurse leaders must recognize the limitations of telemedicine but keep apprised of technologies that make previously unimagined tasks available for home users (Dávalos et al., 2009). New tools like portable EKGs, USB stethoscopes, smartphone exercise apps, and vital sign monitors in the home are making more uses for telehealth a reality (Terry, 2017). Telemedicine provides opportunity for nurse leaders to build trust with other providers and to improve recruitment and retention of employees in rural areas (McPhee, 2014; Reed, 2005).

Obstacles for the future of telehealth are the high cost of providers and incomplete reimbursement models. Telemedicine lacks the organization power of nurse and physician associations, impeding the integration of insurance reimbursement for services (Sommer, 2018). Insurance reimbursement, interstate medical licensure, and hospital credentialing remain the top three barriers to full telehealth integration (Lievens & Jordanova, 2004; Weinstein et al., 2014). Nurse practitioners will garner the support of leadership and legislators by educating others about the incentives to increase telehealth production and the benefits to both provider and patient (Penner, 2017; van Gool, Haas, & Viney, 2002). Local needs are a predominant consideration when endorsing reimbursement models. An appropriate cost-and-time-saving substitute for a primary care visit will reduce the demand, stress, and burnout in an overbooked

clinic (Beck, 2016). If laws to improve Medicare payments for telehealth were enacted under the new reimbursement schemes, nearly \$2 billion is projected to be saved in the next eight years (Avalere Health, 2015).

To prepare a primary care setting for a future in telehealth, the following conditions should be met: leadership support, effective communication within the organization, the establishment of a telemedicine champion, and user-friendly technology (Hope Kolltveit et al., 2017). Evidence shows telehealth to be “as safe, effective and reliable as most conventional methods” (Banbury, Roots, & Nancarrow, 2014, p. 211). Implementation of telemedicine and health monitoring to rural and underserved areas is without detriment and improves professional development for the NP (Reed, 2005). Once regulations are enacted, nurse leaders will be required to find innovative and economic solutions to maintain telehealth gains in their practices (McPhee, 2014).

Healthcare simulation and telemedicine are also changing the face of nursing and medical education. The nurse leader who educates must be prepared for this shift. Instructors are teaching practice via simulated scenarios and are incorporating telehealth proficiency into program outcomes (Fronczek, Rouhana, & Kitchin, 2017). Telesimulations are improving patient outcomes and critical thinking in medical students (Hayden, Khatri, Kelly, Yager, & Salazar, 2018). Student nurses can learn to communicate and educate patients via telehealth, and opportunities for telehealth-astute nursing educators and NPs are increasing.

Conclusion

The future of telehealth depends on regulation of providers, health policy, and patient demographics (Beck 2016). Reimbursement, employment, and education of NPs will be facilitated as restrictions on practice laws are lifted (Penner, 2017). Location, resources, and specialty should be accounted for when considering telehealth implementation (McPhee, 2014).

Nurse-managed health centers will soon be a staple in primary care for underserved populations, and telehealth reimbursement will be needed to serve people and maintain a favorable economic outlook (Penner, 2017).

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