

SEPTEMBER 2019

A Framework for Evaluating the Return on Investment of Telehealth

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Introduction

Healthcare providers are increasingly investing in and deploying telehealth capabilities that will extend services to patients in rural areas, deliver higher-quality care to individuals with complex conditions, and reduce costs associated with unnecessary emergency department (ED) visits, transfers and admissions, among other benefits.

Telehealth programs require institutions to make upfront investments in technology, program design and staffing. While payers are increasingly expanding coverage for telehealth services, receiving reimbursement across all payers at a level commensurate with costs continues to be a challenge. To that end, providers are eager to think beyond reimbursement and understand the potential comprehensive return on investment (ROI) of various telehealth programs.

The ROI of telehealth programs can vary dramatically based on the size, nature, clinical capacity and payment model of the organization. For instance, academic medical centers (AMCs) typically have a highly specialized workforce that treats high-acuity patients across a wide range of clinical domains. In contrast, many community hospitals are smaller, have a more generalized workforce and may not provide comprehensive services at all hours of the day. Similarly, an integrated healthcare delivery system that operates on a value-based versus a fee-for-service basis may be more interested in the cost-saving potential of telehealth programs. The characteristic differences of these institutions make their ROI considerations around various telehealth investments fundamentally different, as summarized in Table 1.

Since the decision to invest in telehealth is highly dependent on institutional objectives and the estimated financial impact of the telehealth program, this brief has been developed with the following aims:

- To propose a framework for calculating the ROI of a given telehealth program;
- To demonstrate how this framework can be applied to two distinct telehealth case studies; and
- To illustrate the financial impact of these specific telehealth programs.

Table 1. ROI Considerations for Different Types of Providers

Institution Type	Potential Considerations
Academic medical centers	<ul style="list-style-type: none"> • Can we extend specialty and subspecialty expertise beyond our four walls via telehealth? • Can we employ telehealth tools to improve care coordination, patient engagement and ongoing health management? • How do we combine telehealth with advanced analytics and artificial intelligence (AI) to offer person-alized medical services? • Can we offer a telehealth platform and services to hospitals, providers and patients outside our system?
Integrated health systems	<ul style="list-style-type: none"> • Can we extend our telehealth platform across the hospitals, clinics and other sites in our system as a means of providing the right care in the right place at the right time? • Can we utilize telehealth services to reduce per-member health expenditures? • Can we integrate virtual care across the continuum of healthcare delivery to increase capacity and grow membership? • Can we leverage AI-driven triage tools to navigate patients to the most appropriate site or method of care?
Community hospitals	<ul style="list-style-type: none"> • Can we offer additional specialty services and reduce avoidable transfers by partnering with local tertiary or quaternary hospitals for virtual consults? • Can we improve provider satisfaction and reduce burnout and turnover by providing virtual backup coverage in the ICU or ED? • Can we increase patient retention by offering direct-to-consumer telehealth services for low-acuity conditions?
Primary care clinics	<ul style="list-style-type: none"> • Can we extend primary and preventive care to remote and vulnerable populations through telehealth services? • Can we better connect our patients to behavioral health and specialty care through virtual visits while they are in rural clinics? • Can we improve outcomes and reduce costs through remote monitoring of patients with chronic conditions?

Principles and Considerations of ROI Modeling for Telehealth

Provider organizations should assess a potential telehealth program's impact on value by evaluating the program's impact on improving revenue, health outcomes and patient experience relative to cost. In addition to the direct economic drivers, telehealth programs can generate value in a number of ways that may be difficult to measure. These include increasing access to care, allowing patients to receive care in more convenient settings, and improving patient and provider satisfaction.

To assist organizations in calculating an observable ROI of a potential telehealth program, the framework proposed in this report relies on the measurable impacts of a program. It does not account for or place value on the nonfinancial benefits noted above. Accordingly, providers should weigh the resulting ROI along with nonfinancial benefits when determining whether or not to move forward with a telehealth investment.

Table 2 provides financial considerations and general questions for providers that are attempting to estimate the financial impact of a telehealth program.

Table 2. Considerations and Guiding Questions for Evaluating Telehealth ROI

Institution Type	Potential Considerations
Patient acuity mix	<ul style="list-style-type: none"> • Will the telehealth program impact the average patient acuity level? • How will revenue and costs change as the patient acuity levels shift?
Cost savings	<ul style="list-style-type: none"> • Will the telehealth program result in cost savings (e.g., redistribution of services within a system, delivery of care in a lower-cost setting)?
New-patient volume	<ul style="list-style-type: none"> • Will the telehealth program result in increased patient volume?
Patient retention	<ul style="list-style-type: none"> • Will the program result in higher patient retention rates?
Reimbursement or contract revenue	<ul style="list-style-type: none"> • Are these telehealth services reimbursable under: <ul style="list-style-type: none"> – State Medicaid program and Medicaid managed care organizations? – Fee-for-service Medicare and Medicare Advantage? – Private payers? • Will the telehealth program bring in other forms of direct revenue for the institution (e.g., payment from a distant site for a teleconsult)?
Technology	<ul style="list-style-type: none"> • What are the hardware and software costs to implement the program?
Program and program management	<ul style="list-style-type: none"> • What are the programmatic costs to design, implement and operate the service?
Staffing	<ul style="list-style-type: none"> • What are the staffing requirements to provide the program? • Will there be associated training costs? • Can we reduce costs by leveraging mid-level providers to provide the service? • Does this program automate existing tasks, thereby reducing professional costs?

Case Studies

Note: All numbers included in the following case studies are hypothetical proxy values used to demonstrate the estimated impact of the telehealth program.

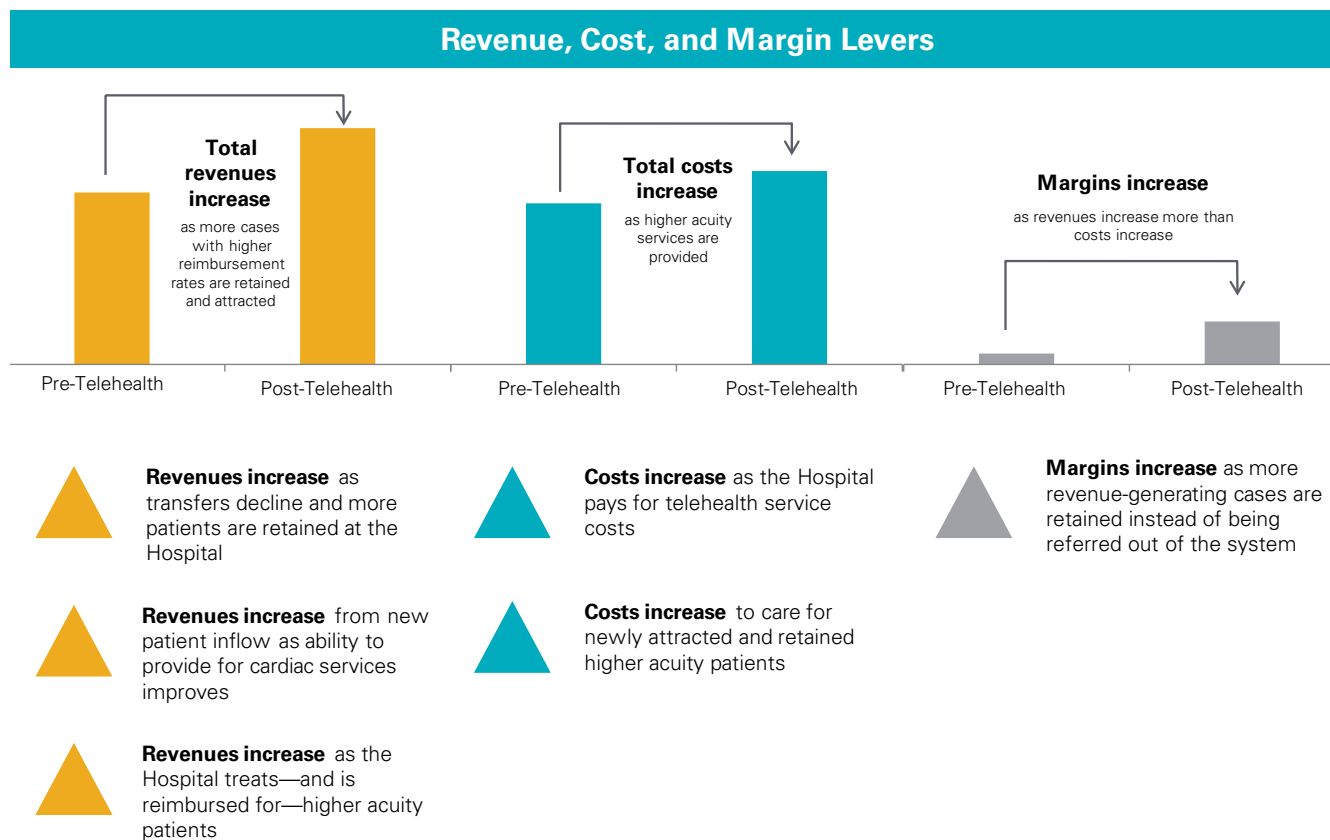
Case Study #1—Rural Community Hospital: Telecardiology Model

A Rural Community Hospital in Virginia is interested in implementing a telecardiology program. Within this model, providers at the Hospital utilize live video and store and forward technologies to remotely connect to a cardiac specialist at a local AMC who can support the decision making of physicians at the Hospital. For example, cardiac electrophysiologists at the AMC may confirm a diagnosis and recommend treatment plans for patients at the Hospital who may have complications with arrhythmia or implantable cardiac devices. The Hospital is interested in implementing this model in order to:

- Improve the quality of care for all patients;
- Retain more patients by reducing avoidable transfers; and
- Attract new patients through enhanced care capabilities.

To model the financial impact of implementing the telecardiology program at the Hospital, the potential effects on revenue, cost and the resulting margin should be examined.

Figure 1. Financial Impact for Telecardiology Program at Rural Community Hospital



The rationale and estimated impact for each ROI driver within the model for the Hospital’s telecardiology program are listed in Table 3.

Table 3. Rationale and Estimated Financial Impact on Various ROI Drivers

ROI Driver	Rationale	Estimated Impact
Patient acuity mix	Patient acuity increases as the Rural Community Hospital retains more high-acuity patients with telecardiology support from the local AMC. Treatment costs rise as acuity levels increase, but not at the same rate as reimbursement.	Average revenue of a cardiology case increases from \$16,000 to \$16,100 as reimbursement for higher-acuity patients increases faster than costs.
Cost savings	The program reduces transfers and helps the Hospital retain patients, but it will not necessarily help lower the cost of care provided or make the care model more efficient.	Limited.
New-patient volume	The Hospital sees a slight increase in cardiology patients as more patients are directed to the Hospital for cardiology care as a result of its connection to the AMC via the telecardiology program.	The Hospital sees an additional 100 new patients per year.
Patient retention	The Hospital retains more cardiology patients as it receives telecardiology support from the local AMC to manage and treat cardiology patients who would have otherwise been transferred to another facility.	The Hospital retains 200 additional cardiology patients per year.
Reimbursement	Medicare ⁱ and Virginia’s State Medicaid Program ⁱⁱ reimburse telecardiology services for medical evaluation at the same rate as the comparable in-person service. In addition, Virginia upholds parity laws that guarantee similar reimbursement levels from private insurers that cover telehealth services. Within the telecardiology model, the local AMC providing the telecardiology consult is eligible for reimbursement. As the distant site in this scenario, the Hospital is eligible to receive a facility fee for serving as the originating site; facility fees vary by payer.	<i>Facility fees are typically nominal (about \$20 per consult) and therefore not included in the ROI estimate.</i>
Technology	The Hospital needs to purchase at least one telehealth cart and may need to invest in EHR enhancements in order to connect with the local AMC.	The Hospital invests \$10,000 in upfront technology costs to launch the telecardiology program.
Program and program management	As a member or affiliate of the local AMC’s telecardiology program, the Hospital pays an annual program fee and/or per-consult fee.	The Hospital pays the local AMC \$100,000 per year for telecardiology consults.
Staffing	There are no anticipated major clinician or staff costs for the Hospital within this program. Staff training is included in annual program fees paid to the local AMC.	Limited.

i Center for Medicare & Medicaid Services, Medicare Learning Network, Telehealth Services. (2019).

ii Virginia Code Annotated § 38.2-3418.16 (2012).

Table 4 provides a summary of the estimated financial impact of implementing the telecardiology model at the Hospital.

Table 4. Summary of Estimated Financial Impact

	Current State	Future State With Telecardiology
Revenue Inputs		
Annual number of patients	5,000	5,300 = 5,000 patients + 100 new patients + 200 retained patients
Total revenue	\$80,000,000 = 5,000 patients * (\$16,000 average revenue per case)	\$85,330,000 = 5,300 patients * (\$16,100 average revenue per case)
Cost Inputs		
Total care costs for patients	\$60,000,000 = 5,000 patients * (\$12,000 average cost per case)	\$63,600,000 = 5,300 patients * (\$12,000 average cost per case)
Technology costs	\$0	\$10,000
Program costs	\$0	\$100,000
Staffing costs	\$0	\$0
Budget Summary		
Total direct margin = total revenue less total care costs	\$20,000,000	\$21,730,000
Total technology, program and staffing costs	\$0	\$110,000
Total estimated impact	\$20,000,000	\$21,620,000
Difference between current and future state		\$1,620,000

The estimated positive financial impact of implementing the telecardiology program at the Hospital totals approximately \$1.6 million per year. These results are largely the result of increases in volume and acuity, rather than new reimbursement revenue for the telehealth service.

In addition to the financial impact noted in Table 4, the implementation of a telecardiology program at the Rural Community Hospital will allow patients to receive care in more convenient and accessible community settings, when appropriate, which would likely improve the patient and family experience.

Case Study #2—Capitated Hospital System: Pre-transfer Video Consults

A Hospital System in Washington State is comprised of a network of providers, including a flagship tertiary hospital and smaller community hospitals. The Hospital System operates on a capitated basis, taking on full financial risk for its patients, and is consequently incentivized to seek ways to deliver care more efficiently. The Hospital System is responsible for 1 million lives, for which it receives a capitated per member per month (PMPM) payment of \$600 to cover each member's cost of care. In a given year, the Hospital System typically conducts transfers of about 10,000 members between its hospitals. These transfers result in higher costs to the Hospital System through the cost of the transfer itself, as well as the higher cost of delivering care in a tertiary setting. The other 990,000 members (of 1 million total members) will not be transferred. The average cost of care for non-transferred members is \$590 PMPM. The Hospital System has conducted an internal analysis and determined that some of the transfers may be avoidable. In an effort to reduce the transfer rate, the Hospital System is considering implementing a pre-transfer video consult program.

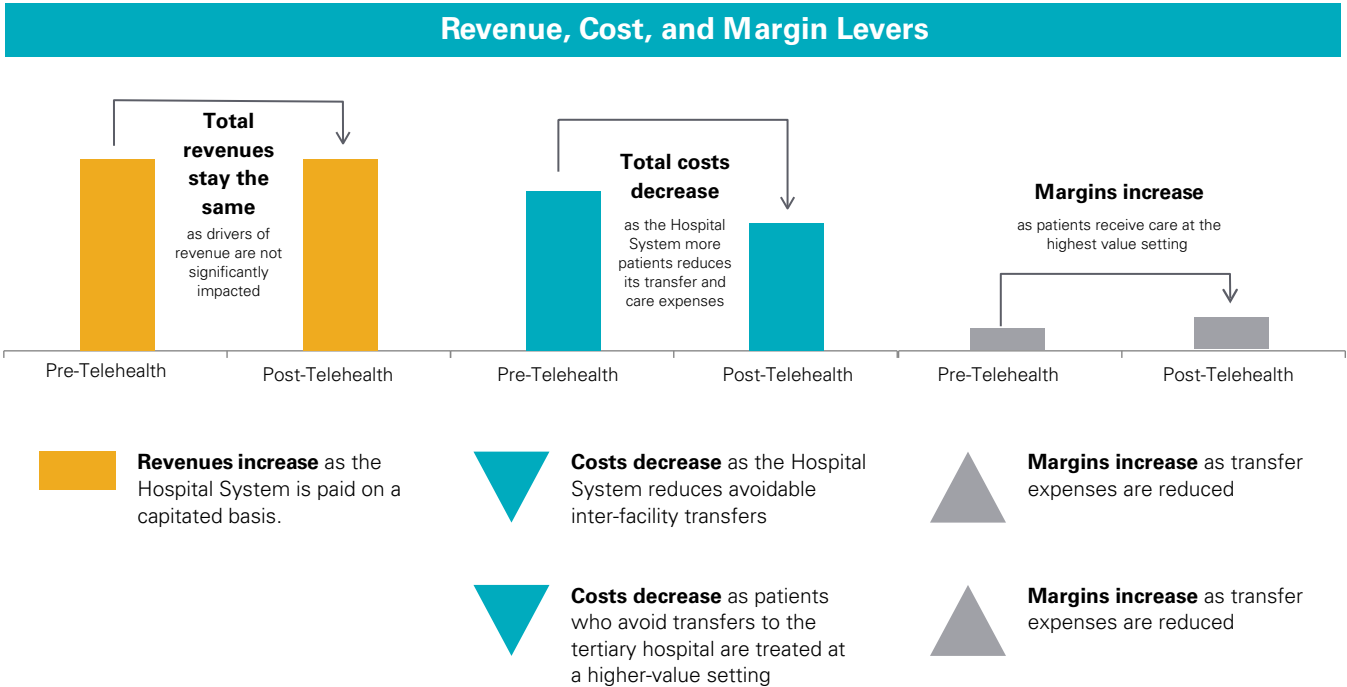
For the pre-transfer video consult program, a provider at the Hospital System's community hospital would utilize video consult technology to connect with a provider at the tertiary hospital site to visually assess selectⁱⁱⁱ potential transfer patients and determine whether a transfer to the tertiary site is necessary. When appropriate, the remote provider at the tertiary hospital would enable the provider at the community hospital to treat the patient locally, eliminating the cost of transfer and delivering care in a lower-cost setting. Through implementing this model, the Hospital System aims to:

- Reduce the number of avoidable transfers;
- Provide care in the highest-value setting; and
- Improve quality of care and patient experience.

To model the financial impact of implementing the pre-transfer video consult visit program, the potential effects on revenue, cost and the resulting margin should be examined.

ⁱⁱⁱ Typically within a pre-transfer program, hospitals focus on select conditions that would benefit from a pre-transfer virtual assessment (e.g., potential stroke, burns). Programs can expand over time to include additional clinical conditions.

Figure 2. Revenue, Cost and Margin Impact for Pre-transfer Consult Program at the Hospital System



A detailed rationale for and the estimated impact of each consideration within the ROI model for the Hospital System’s pre-transfer video consult program are shown in Table 5.

Table 5. Rationale and Estimated Financial Impact on Various ROI Drivers

ROI Driver	Rationale	Estimated Impact
Patient acuity mix	Patient acuity mix of the Hospital System increases slightly as a result of the tertiary hospital having additional capacity to treat more high-acuity patients; however, this driver is not likely to have a significant impact at the system level.	Limited.
Cost savings	Low-acuity patients that would have been treated at the tertiary hospital are instead treated at the community hospital, which delivers lower-cost care due to lower staffing and operating costs than at the tertiary hospital. The cost of transferring these patients is also eliminated.	The average cost of care per case decreases from \$11,000 to \$8,000 for patients retained in a community hospital. The Hospital System saves \$300 per case per avoided transfer.
New-patient volume	The Hospital System does not see significantly more patients as a result of implementing this telehealth program.	Limited.
Patient retention	The community hospitals see a slight increase in patient retention rates as a result of participating in the pre-transfer consult program. Patient retention at the tertiary hospital does not change.	Limited.
Reimbursement	The Hospital System receives capitation payments on a PMPM basis as opposed to fee-for-service reimbursements. Since the Hospital System takes on full risk for its members, it is incentivized to implement programs, such as this pre-transfer telehealth program, that will help it deliver more efficient care.	Limited.
Technology	The Hospital System purchases virtual consult robots at both distant (tertiary hospital) and originating (community hospital) sites that are participating in the pre-transfer consult program.	The Hospital System invests \$30,000 in upfront technology costs to launch this program.
Program and program management	The Hospital System makes programmatic investments to design and operate this program.	The Hospital System invests \$60,000 for program design and management costs.
Staffing	The Hospital System trains their transfer center staff and clinicians at the tertiary and community hospitals who would be utilizing the pre-transfer consult technologies. Additionally, the Hospital System incurs the cost of having more physicians on call to address pre-transfer video consult requests.	The Hospital System invests \$50,000 in staff training and additional on-call physician time.

Table 6 provides a summary of the estimated financial impact of implementing the pre-transfer video consult model at the Hospital System

Table 6. Summary of Pre-transfer Consult Estimated Financial Impact

	Current State	Future State With Telecardiology
Revenue Inputs		
Annual number of patients = members not requiring transfers + members requiring transfers	1,000,000 = 990,000 members not requiring transfers + 10,000 members requiring transfer	1,000,000 = 990,000 members not needing transfers + 9,000 members requiring transfer + 1,000 transfer-avoided members
Capitation payment (per member per month)	\$600 PMPM	\$600 PMPM
Total revenue	\$7,200,000,000 = 1,000,000 members * \$600 PMPM * 12 months	\$7,200,000,000 = 1,000,000 members * \$600 PMPM * 12 months
Cost Inputs		
Baseline total care cost for all members	\$7,080,000,000 = 1,000,000 members * \$590 average PMPM cost * 12 months	\$7,080,000,000 = 1,000,000 members * \$590 average PMPM cost * 12 months
Additional cost of care for members requiring transfers	\$113,000,000 = 10,000 transferred members * (\$11,000 treatment cost + \$300 transfer cost)	\$109,700,000 = 9,000 transferred members * (\$11,000 treatment cost + \$300 transfer cost) + (1,000 transfer-avoided members * \$8,000 treatment cost)
Technology costs	\$0	\$30,000
Program costs	\$0	\$60,000
Staffing costs	\$0	\$50,000
Budget Summary		
Total direct margin = total revenue less total care costs	\$7,000,000 = \$7,200,000,000 – (\$7,080,000,000 + \$113,000,000)	\$10,300,000 = \$7,200,000,000 – (\$7,080,000,000 + \$109,700,000)
Total technology, program and staffing costs	\$0	\$140,000
Total estimated impact	\$7,000,000	\$10,160,000
Difference between current and future state		\$3,160,000

The estimated positive financial impact of implementing the pre-transfer video consult program at the Hospital System totals approximately \$3.2 million per year.

In addition to the financial impact noted in Table 6, the implementation of this program may also allow the Hospital System to strengthen relationships among hospitals across the system and enhance the quality of transfers between system hospitals.

Conclusion

Providers are leveraging telehealth to optimize delivery of care, reach patients in remote locations, and improve care quality and overall patient satisfaction. Healthcare institutions should anticipate that for the time being the most significant financial benefits from telehealth programs are likely to be the result of changes to patient acuity levels and increases in new or retained patient volume, rather than the result of increases in reimbursement.

Telehealth adoption is still in its nascent stages in the United States, and the overall evidence base is still limited. However, healthcare leaders can use the framework detailed here to reasonably estimate the ROI of telehealth programs to evaluate the merits of implementing and scaling telehealth activities.

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