

TELEHEALTH BUSINESS MODELS

AN ASSESSMENT TOOL FOR TELEHEALTH BUSINESS OPPORTUNITIES IN REMOTE RURAL COMMUNITIES

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PREFACE

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University of Alaska Anchorage Institute of Social & Economic Research consultative team consisted of Professor Matt Berman and Research Associate Rosyland Frazier.

Any remaining errors or omissions remain the responsibility of the primary author, Mark Foster. Please direct comment and inquiries to mafa@gci.net.

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Telehealth Business Models

AN ASSESSMENT TOOL FOR TELEHEALTH BUSINESS OPPORTUNITIES IN REMOTE RURAL COMMUNITIES

EXECUTIVE SUMMARY

INTRODUCTION

Investments in telehealth technology and associated process improvements have the potential to improve the efficiency of health care delivery – enabling improved access to specialty care, a continuing challenge in remote rural communities.

Instead of having a patient travel to see a specialist or vice versa, the specialist sees the patient using telecommunications technology. This has considerable potential to reduce travel associated with serving remote rural populations and to extend the reach of a specialist to previously underserved populations.

We focus on the use of asynchronous “store and forward” (analogous to e-mail with attached images and data) communications technology to transfer patient information to the specialist to substitute for in-person specialist encounters.

Store and forward systems provide specialists with attractive opportunities for productivity gains – the specialist can process telehealth cases similar to e-mail – in between other work or as a batch during a designated time block.¹

POTENTIAL GAINS AND LOSSES

While the specialist can anticipate labor productivity gains from the implementation of a telehealth program, the primary care provider may require a modest increment of time to set up, generate, transmit, receive and process the resulting specialist telehealth consultation. On the other hand, the primary care provider may well experience a significant increase in the number of patients it sees following the offering of virtual specialty care, which can provide the primary care provider with a net gain in revenue beyond direct reimbursement for the origination of a telehealth case.

Conversely, if the specialist is currently receiving referrals from the primary care provider, the specialist could conceivably reduce her overall revenue by reducing the number of low intensity referrals through improved triage with telehealth consults. However, given the relative scarcity of specialists serving remote rural areas, the more likely result of reducing low intensity referrals is to enable the specialist to see more high intensity cases sooner and either expand access or reduce the patient queue or both.

So when does it make sense to invest in a telehealth program?

¹ In contrast, live videoconferences tend to require a higher level of coordination of schedules at both the send and receive end of the transmission, limiting the potential productivity gains relative to the scheduling flexibility typical of store and forward deployments.

FINANCIAL TEMPLATE

The purpose of this report is to provide an overview of when the potentially offsetting considerations favor telehealth investments. To that end, we provide users with a financial template to assist them with the business model question of “how is value delivered to my customer and at what cost?” – assuming that the customer(s) may include a primary care provider, a specialist, an insurance company, a health care system, the entity paying for travel, and patients.²

The financial template allows users to enter their site specific estimates regarding changes in referral patterns with and without telehealth and the revenues and costs that result from the changes in referral patterns. In addition, we provide a spreadsheet to enable the user to estimate the potential value of patients’ time saved by avoiding travel and the value to patients of reduced wait time in the queue for specialty care.

In addition, we provide a number of illustrative business cases primarily designed to show the potential complexity of the inter-relationship of parameters and assist users with understanding how they might use the template to build business cases for their particular circumstance.³

We also provide several examples of sensitivity analysis to assist users with understanding how they might use the template to develop “break-even” analyses and identify when the changes in referral patterns and case mix might trigger a need for increased staff or result in longer queues.

CONCLUSION

After distilling the feedback we received in interviews and working through several cases, we find a **critical element in the financial assessment of telehealth opportunities involves estimating the changes in patient referral patterns and travel**. Thus, a key question facing prospective customers is what is their appetite for risk and what is the risk and reward profile of any particular deployment they are contemplating, especially in light of the uncertainty associated with changes in referrals.

Thus, we believe the financial template has three important values for prospective users:

1. Encourages investigation into how telehealth might impact the business of health care by providing a relatively detailed example of how several elements of a system might fit together into a working whole
2. Provides an opportunity to quickly estimate potential financial results *from a variety of perspectives* given user specified assumptions
3. Provides an opportunity to conduct multiple sensitivity analyses to begin to understand the potential risks and rewards of a particular deployment.

In addition, we note that depending upon particular combinations of referral pattern changes, revenues and costs, any one of several parameters may emerge to become critical to the financial results.

² See Analysis Section below.

³ See Appendix: Financial Template Table of Contents, “Illustrative Cases.”

Accordingly, we encourage prospective investors in telehealth programs to read Telemedicine Technical Assistance Documents: A Guide to Getting Started in Telemedicine (U.S. Department of Health and Human Services, Health Resources and Services Administration, Office for the Advancement of Telehealth, 2004) and especially to follow the admonition of Joseph A. Tracy, et al, contained in *the planning steps* recommended in “First Steps in Creating a Successful Telehealth Program”:⁴

1. Understand the needs and demands of your target population
2. Develop an initial conservative estimate of what the program might cost and provide ideas on how it may be funded.
3. Find several existing telehealth programs that appear to be a good fit for your program and send administrative, clinical and technical staff to meet with peer groups to develop a deep understanding of how a telehealth program works in real life
4. Refine the list of best telehealth services to offer the target population – *do not attempt to implement more than two or three services at the beginning as it will stretch human resources too thin and lead to unrealistic expectations in delivering the service*
5. Clearly define your measurable objectives, including timelines and name of party responsible for the objective
6. **Refine the estimated costs to the institution [e.g., specialists] and the partner sites [e.g., primary care providers].**
7. **Project the positive outcomes and potential pitfalls**
8. **Perform a cost benefit analysis⁵**

We believe the financial template and associated analysis developed in this report can assist prospective telehealth project planners with steps 6, 7 and 8 above – thinking through their measurable financial goals, projected costs and benefits, risks and rewards associated with their particular project.

Finally, we remind users that the strength of any financial planning tool is in its usefulness in helping focus the attention of the planning and execution team on how **all elements of a system fit together into a working whole to create sustainable value for customers.**⁶

⁴ See “First Steps in Creating a Successful Telemedicine Program”, J. Tracey, et al., Chapter 2, Telemedicine Technical Assistance Documents: A Guide to Getting Started in Telemedicine (2004), available at <http://telehealth.muhealth.org/geninfo/TAD.html>

⁵ Please note that several recommendations follow the first eight which are paraphrased here for the purpose of providing context for the financial template and analysis presented in this report.

⁶ See “Why Business Models Matter”, Joan Magretta, Harvard Business Review, May 2002.

PROJECT OVERVIEW

GOAL

The goal of this project was to develop business models to assist prospective users of telehealth technology, especially telehealth modalities associated with the AFHCAN telehealth cart (dermatology, Ear Nose Throat (ENT)), with an evaluation of potential telehealth program investments.

PROJECT WORK PHASES

The first phase of the project focused on gathering telehealth and telemedicine financial information and conducting interviews to assess how the introduction of telehealth business process changes changed the patient referral patterns and associated revenues, costs and opportunity costs for patients and health service providers.

The second phase of the project consisted of developing a financial template that would enable users to evaluate prospective telehealth investments from the business perspective of cash flows with and without the technology investment and associated changes in the service delivery process. In addition, we provided a module in the financial template to enable estimates of the value of patient time, including the value of lost time due to unnecessary travel and the value of reducing waiting times in queues to see specialists.

During the first and second phases of the project, the project team made an effort to solicit and develop case study data to enable us to provide illustrative examples and potentially to provide guidance on what assumptions might be appropriate to use in the financial template. While we were able to solicit anecdotal data from a variety of interviews, we found the data tended to be focused within 1) a particular perspective – a patient, a primary care provider, a specialist, a telehealth project proponent, 2) an anecdotal time frame, 3) an anecdotal scope of service frame, 4) a particular geography, and perhaps most importantly, 5) a particular set of patient referral patterns that appeared to be influenced by a wide variety of local circumstances.

SYNTHESIS OF FINANCIAL TEMPLATE

Thus, we found it quite challenging to synthesize the anecdotal and highly heterogeneous information from a variety of perspectives into a financial template that would enable users to assess the financial attractiveness of an investment in telehealth technology and the associated transformation of their health care service delivery process. In order to accommodate the heterogeneity of potential telehealth deployments and the wide range of “what about” questions we received in the course of the project, we found the financial template quickly grew from a simple “substitute telehealth consults for patient travel” into a large multi tab workbook that includes:

- Patient referral patterns with and without telehealth, including
- Primary care provider referrals, revenues and costs, evaluation and management and treatment procedures
- Specialist provider referrals, revenues and costs, evaluation and management and treatment procedures

- Patient travel costs, travel time, waiting in queue time
- Insurance/Patient payments for procedures
- Universal Service Fund support for rural health care telecommunications
- Primary + Specialist Combined Perspectives
- Patient Travel Cost Savings + Insurance/Patient payments for procedures
- Total System Net Economic Value Perspective

We encourage prospective users to familiarize themselves with the “Users Guide” in the Appendix and review the illustrative cases contained in the financial template along with the discussion in the Analysis section before developing their own case studies.

DEFINITIONS OF BUSINESS TERMS

In addition to the challenges that arise from the heterogeneity of data, over the course of the project it became evident that the use of the term “business model” was being used across a variety of contexts and meanings, including most typically the financial projections associated with a business plan.

For the purpose of this report, we would like to offer the following definitions to clarify our use of terms and to help users integrate the results of their financial projections into their business planning process. Our definitions are derived from commendable articles in the Harvard Business Review referenced as footnotes to the subsection headings below.

BUSINESS PLAN⁷

A business plan systematically assesses four interdependent factors critical to every new venture: 1) the People, 2) the Opportunity, 3) the Context, and 4) the Risk and Reward.

The financial template can assist users with their assessment of the financial **opportunity** and the financial **risks and rewards** associated with a new telehealth venture.

BUSINESS MODEL⁸

A good business model answers the questions: Who is the customer? What does the customer value? How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?

In the case of the telehealth cart, the basic business model involves supplementing primary care triage with telehealth specialist consults - improving the effectiveness of triage and potentially reducing travel, and substituting telehealth consults for in-person post treatment case management – reducing travel requirements.

⁷ Based on “How to Write a Great Business Plan”, William A. Sahlman, Harvard Business Review, July-August 1997.

⁸ “Why Business Models Matter”, Joan Magretta, Harvard Business Review, May 2002.

RESEARCH

We conducted background research for telehealth business models and telehealth financial templates that included a review of the on-line sources and prominent journals and interviews with subject matter experts.

LITERATURE REVIEW

We conducted a search of on-line sources and journals for telehealth business models and associated financial templates.

On-line resources included:

<http://tie.telemed.org/>

The Telemedicine Information Exchange

<http://www.atmeda.org/>

The American Telemedicine Association

<http://www.telemedtoday.com/>

An on-line journal whose last issues appear to be from 2002

<http://www.nlm.nih.gov/research/telemedinit.html>

United States National Library of Medicine, National Telemedicine Initiative

<http://www.lib.uiowa.edu/hw/telemed/>

University of Iowa Hardin Library for Health Sciences, Health Web, Telemedicine

<http://www.federaltelemedicine.com/>

Federal Telemedicine News

<http://telemedicine.org/>

Internet Dermatology Society

<http://www.telemedicine.com/>

Telemedicine Portal Site

<http://www.healthsystem.virginia.edu/internet/telemedicine/>

University of Virginia Health System, Office of Telemedicine

<http://www.tis.bl.uk/>

UK Telemedicine and E-health Information Service

<http://trc.telemed.org/>

Telemedicine Research Center, Oregon

<http://www.telemedicine.arizona.edu/>

Arizona Telemedicine Program

JOURNALS

Prominent journals included:

Telemedicine and e-Health

Official Journal of the American Telemedicine Association

Journal of Telemedicine and Telecare

Royal Society of Medicine (U.K.)

A few articles stand out as being particularly insightful and are recommended to prospective telehealth program planners as they begin to assemble information on the potential changes in referral patterns, revenues and costs for their projects. These include:

“Research Findings and Strategies for Assessing Telemedicine Costs,” Tim Reardon, *Telemedicine and e-Health*, Volume 11, Number 3, June 2005

“The Relative Cost of Outpatient Telemedicine Services,” Jeffrey Stensland, et al, *Telemedicine Journal*, Volume 5, Number 3, 1999

SUMMARY OF LITERATURE REVIEW

After two separate rounds of literature search, we concluded that the public record did not contain a prominent example of a telehealth financial template that was well suited to the AFHCAN cart or a similar hardware/software integration aimed at remote rural markets where dermatology, ENT and other store and forward specialties suited to store and forward technologies were prominent needs.

INTERVIEWS

We conducted interviews with a variety of subject matter experts on telemedicine and telehealth projects and program delivery. These included:

Stuart Ferguson, Director, Alaska Federal Health Care Assess Network (AFHCAN)

Dr. Kookesh, ENT Specialist, AFHCAN

Dr. Bocachica, Dermatology Specialist, AFHCAN

Jay H. Sanders, M.D., The Global Telemedicine Group

Tom Bohn, B2 Networks, Telemedicine Networks

Tom Bunger, B2 Networks, former manager AFHCAN wide area network

Jim Lamb, Director, Patient Financial Services, Alaska Native Medical Center

Richard H. Marcus, MD, Cardiologist, Echocardiography, Iowa Heart Center

ANALYSIS

The financial template and associated analysis provides telehealth project planners with a tool to assess the financial dimensions of their business plan and specifically encourage users to answer the business model question of how does the telehealth cart deliver value to prospective customers at an appropriate cost.

BUSINESS PLANS⁹

A business plan systematically assesses four interdependent factors critical to every new venture:

1. The People
2. The Opportunity
3. The Context
4. The Risk and Reward

The financial template can assist users with their assessment of the financial **opportunity** and the financial **risks and rewards** associated with a new telehealth venture.

THE OPPORTUNITY

For example, a good business plan should address the following questions about the telehealth cart business **opportunity [emphasis added]**:

- Who is the customer? (Primary Care, Specialist, Insurance, Health System, Travel Payer, Patients, Travel Payer, Universal Service Fund)
- How does the customer make decisions about buying the telehealth cart? (Who within the customer organization is responsible for purchase decisions and how do they get made)
- To what degree is the telehealth cart a compelling purchase for the customer?
- **How will the telehealth cart be priced?**
- How will the telehealth cart sales team reach all of their identified customer segments?
- How much does it cost (in time and resources) to acquire a customer?
- **How much does it cost to produce, deliver and maintain the telehealth cart?**
- **How much does it cost to support a customer?**
- How easy is it to retain a customer?

The financial template allows the user to specify the up front cost of the cart, how much of the cost of the cart and potentially required investments in telecommunications equipment,

⁹ Ibid, "How to Write a Great Business Plan"

circuits, and server storage, might be directly attributed to telemedicine clinical activities as separate from general training purposes or electronic health records or billing systems.

In addition, the financial template allows the user to specify the ongoing operations, training, and support costs that are required to maintain the cart and its software support system as well as the associated telecommunications equipment, circuits and server storage – and how those costs might be charged to the primary care provider and specialist.

THE RISKS AND REWARDS

A good business plan will assess the people, opportunity and context from a variety of perspectives and take into account several possible combinations of future circumstances. These assessments are often done with the use of alternative scenarios and sensitivity analysis of key parameters that influence the financial outcome. A common way to help visualize the results of these risk and reward analyses is to present the net cash flow over time.

The financial template is designed to enable a user to vary the majority of referral pattern and financial assumptions from a single assumptions page and visualize the summary results in graphical form.

In addition, we have provided several illustrative cases, including graphics of discounted cash flow over time to assist users with the visualization of the risk and reward associated with their particular circumstances.

BUSINESS MODELS¹⁰

A good business model answers the basic questions: Who is the customer? What does the customer value? It also answers the business manager's questions: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?

In the case of the telehealth cart, the basic business model involves supplementing primary care triage with telehealth specialist consults - improving the effectiveness of triage and potentially reducing travel, and substituting telehealth consults for in-person post treatment case management – reducing travel requirements.

There are direct productivity benefits for the specialist in efficient processing of asynchronous telehealth cases.

There are secondary benefits to the primary care provider typically associated with regaining primary care referrals that have bypassed the primary care provider because of a lack of access to specialty care.

There is the potential for travel savings among new patients in their initial triage at the primary care facility to ascertain the nature and severity of their condition.

There is the potential for travel savings for patients who can be monitored by the specialist via telehealth consults rather than having to fly to a specialist for an in-person visit. To the extent their conditions warrant, return travel can be avoided.

¹⁰ Ibid, “Why Business Models Matter”

Anecdotal evidence from the AFHCAN project suggests that as much as 37% of the travel to see a specialist could have been avoided if the specialist participated in the initial triage to direct patients to their most appropriate point of initial care or the specialist was able to do post treatment follow-up and management via telehealth rather than in-person.

When the triage and case management is pushed upstream to the local primary care provider, the local primary care provider has the opportunity to provide local treatment and ancillary services that may have otherwise been provided in the community where the specialist was located.

These potential benefits need to be compared over time to the initial capital and ongoing operating and support costs for clinical image acquisition equipment, picture archive and data communications systems, and associated telecommunications equipment and services. In addition, initial training and subsequent refresh training costs need to be considered.

Another key cost consideration is whether there are adequate staff resources – clinical, technical and administrative - to support the program, especially if the service attracts patient volumes that grow beyond the initial capacity of the primary care provider and/or the specialist. For example, if volumes grow beyond the initial capacity of a specialist, either a queue forms or additional specialist resources need to be made available. Depending upon the particular labor market and the ability to attract and retain personnel or itinerants, this could require the hiring of part-time to full-time specialist and have a significant incremental cost. The financial template allows the user to specify whether their particular labor market is best characterized as adding primary care and specialist labor in weekly, monthly, or annual increments.

Another key set of cost considerations typically related to the size of the primary care or specialty care practice.

PRIMARY CARE – SMALL PRACTICE

In the case of the small primary care practice, the direct and indirect costs associated with planning, training, implementation, and maintaining proficiency for telehealth services and systems may be a material consideration. In addition, the capital costs associated with the clinical image acquisition equipment, picture archive/patient data support systems, and potential upgrades in telecommunications systems to enable clinical quality reliability may be significant.¹¹

PRIMARY CARE – MEDIUM/LARGE PRACTICE

As the primary care practice scales up to larger sizes with more personnel, the potential to have a smaller group specialize in the planning, training and maintenance of proficiency may help to reduce the unit costs. In addition, the capital costs typically can be spread over a larger number of patients, reducing unit costs.

¹¹ See for a rough analogy, the discussions on the adoption of health information technology and electronic health records in community health centers and small practices. For example, “Health Information Technology and Quality Improvements for Community Health Centers”, Kevin Fiscella, H. Jack Geiger, *Health Affairs*, Volume 25, Number 2, pp. 405-412

SPECIALTY CARE – SMALL PRACTICE

In the case of the small specialist practice, the direct and indirect costs associated with planning, training, implementation, and maintaining proficiency for telehealth services and systems may be a material consideration. In addition, the capital costs associated with the clinical image review equipment, picture archive/patient data support systems, and potential upgrades in telecommunications systems to enable clinical quality reliability may be significant.¹²

SPECIALTY CARE – MEDIUM/LARGE PRACTICE

As the specialty practice scales up to larger sizes with more personnel, the potential to have a smaller group specialize in the planning, training and maintenance of proficiency may help to reduce the unit costs. In addition, the capital costs typically can be spread over a larger number of patients, reducing unit costs.

In the case of a medium or large practice where specialists serve in an “on-call” capacity and the “on-call” queue is open periodically, reflecting the availability of capacity, the on-call specialist may be able to efficiently process telehealth consult cases in between on call cases. This situation allows telehealth specialty consults to be conducted at little, if any, incremental labor cost. If the service is expanded to previously underserved populations, the additional volumes may result in the formation of queues or the need to add additional labor capacity.

DEVELOPMENT OF THE FINANCIAL ANALYSIS TEMPLATE

After the initial review of the on-line and literature sources described above, we interviewed a number of subject matter experts from telemedicine and telehealth, including many people familiar with the AFHCAN telehealth cart and a select sample of subject matter experts with several years of “lower 48” telehealth experience to understand how the deployment of the cart or similar modalities (dermatology, ENT) changed referral patterns, revenues and costs from the perspective of primary care providers, specialists, travel payers, patients, insurance/health care coverage payers and the universal service fund support for rural health care – a significant form of financial support that enables rural Alaskan residents to access a wide range of up to date health care services via modern T1 connections.

Based on the interviews and follow-up discussions with the project advisory committee, the Alaska Telehealth Advisory Council, and others in the field of telehealth, it became clear that while prospective users wanted the “business model” (what we believe is more precisely terms a financial analysis template) to be both simple and to enable the user to examine a number of potential what if questions that was reflective of a wide variety of perspectives involved in the delivery of health care services and the heterogeneity of experience and anecdotal data.

In the end, our approach to developing the financial analysis template has been to incorporate a fairly large, but not all encompassing, number of variables to enable users to adopt the template to their particular circumstances and to encourage prospective telehealth planners to think deeply about how all of elements of the system (people, training, data acquisition equipment, picture archive and communications systems, etc.) come together to provide sustainable value to the many constituencies and customers of telehealth services when compared to alternative health care service delivery models, e.g., patients travel to see specialists, specialists travel to rural communities on an

¹² Ibid.

intermittent basis, mid-level health care providers travel to rural communities on an intermittent basis.

LIMITATIONS ON ANALYSIS, ILLUSTRATIVE BUSINESS CASES

The underlying math and cell links in the financial analysis template have been checked and verified several times. Nonetheless, errors may remain.

In addition, the underlying relationships between many of the variables have been simplified in a number of cases to attempt to reduce the “driver’s seat” for the template (the spreadsheet tab that allows users to modify assumptions and see the results from each perspective) to one page. These simplifications may or may not make sense for any particular circumstance.

If you believe you have found an error or a simplification that you would like to dissect to more closely reflect your particular circumstance, please send an e-mail with the subject line “Telehealth Template” to mafafa@gci.net with your notes, questions or concerns.

Finally, because the underlying data that we were able to obtain was largely anecdotal and rigorous business case studies with and without telehealth systems deployments were not available, the illustrative cases that we offer may or may not reflect any actual circumstances. To the extent they do, it may be purely coincidental.

Nonetheless, we do present illustrative cases to demonstrate the potential range of uses for the financial template and to encourage users to explore their particular circumstances with the aid of the template.

ILLUSTRATIVE BUSINESS CASES

We have developed four basic illustrative cases:

- Remote Rural – compare patient travel to a specialist for evaluation and management in a remote rural (high cost of travel, high universal service fund support, high cost of equipment and support services) setting to specialist providing telehealth consults
- Underserved Population – compare travel to a specialist for evaluation and management to specialist service via telehealth consults in an underserved population where patients do not seek specialist care until it is more readily available in their local community – generating more encounters for both primary care and specialists, all other things being equal.
- Itinerant Specialist – compare specialist traveling to rural primary care provider facilities to specialist providing telehealth consults.
- Recapture Local Bypass – compare travel to specialist for evaluation and management to specialist service via telehealth consults where the local primary care provider is able to recapture a portion of the patients who were otherwise bypassing their facility.

The four illustrative cases are provided in detail in the financial template – including the assumptions, financial results over five years and associated referral patterns – from each of the myriad perspectives involved in the delivery of telehealth care.

In addition, we provide a series of spreadsheet tabs that analyze potential break-even telehealth consult volumes for a wide range of referral patterns, triage effectiveness improvements, bypass recapture and varying percentage attributions of the capital investment to the telehealth services.

Among other things, it became evident to us during the course of conversations with subject matter experts and experimenting with various combinations of assumptions that there remain many circumstances when the apparent cost to one or another of the many perspectives is greater than the associated revenue while another perspective may be showing a net gain of millions of dollars.

A common example of this is the potential for travel savings to be significant in remote rural settings where the primary care provider in a village is not highly trained in triage and providing telehealth specialty consults greatly enhance the effectiveness of triage. In these remote rural settings patient volumes may not be sufficient to generate enough *direct revenue* for the local primary care provider to justify the investment in local equipment, services, training and telecommunications support unless the provider is part of a system that also receives the benefit of the travel savings.

This may be considered a barrier to cost effective deployments of telehealth. For a discussion of barriers to cost effective telehealth deployments, see the section below.

BARRIERS TO COST EFFECTIVE TELEHEALTH DEPLOYMENTS¹³

This is a description of factors that might pose impediments to telehealth adoption even when a financial model determines that it is cost-effective. The barriers generally fall into three categories: (1) billing or third-party reimbursement issues, (2) provider network issues, and (3) medical practice issues.

THIRD-PARTY REIMBURSEMENT ISSUES

Existing rules adopted by third-party payers may not accommodate telemedicine. Or if they do, the reimbursement schedule is insufficient or poorly aligned.

- Telehealth consultations may not be considered a covered service. Lack of relevant billing code. Note that Alaska is ahead of other states in having Medicaid billing code for telehealth consultations.¹⁴
- Even if covered, the allowed reimbursement rate may be lower than the cost for one or more providers in the system.¹⁵
- Some providers have obtained facility fees for provision on-site services. Other providers -- generally smaller providers who do not bill for facility fees -- have to squeeze the cost of telehealth infrastructure within the physician fee. Depending on the size of the facility fee, the difference in third-party reimbursement rates among providers may be quite large.

NETWORKING ISSUES

Telehealth facilitates communication among medical providers located at different sites. The financial model focuses on consultations between dispersed primary care providers and centrally located specialists. To be successful, implementation of telehealth applications needs to take into account the way that the different providers are organized into health care networks.

Organized comprehensive systems of care -- such as public health systems and corporate health maintenance organizations -- have certain advantages in this regard, because the formal links between primary care providers and specialists are already built into the structure of the system. Private clinics may nevertheless benefit from participating in telehealth consultations, provided that the financial and other incentives are properly aligned. Even in a formal organized system, telehealth innovations will be most successful if providers view them within the context of a broader system of health care delivery.

- Even if net benefits of implementing a telehealth application are large overall, a financial obstacle may arise if the benefits are not aligned well with the costs. In particular, the net

¹³ The primary author of the section "Barriers to Cost Effective Telehealth Deployments" is Professor Matt Berman.

¹⁴ See Stuart Ferguson, Ph.D, at page 427, "Telethinking", Telemedicine and e-Health, Volume 11, Number 4, 2005.

¹⁵ The reimbursement rate for the originating side of a telemedicine consult has been \$20 per consult for many insurers. In a telehealth system where many infrastructure costs for the originating site are fixed, this rate structure favors originating sites that have higher volumes.

benefits must be positive for all parties: the specialist, the primary care provider, and also the patient. Often the specialist sees the greatest advantage, by being able to increase revenue from consultations and procedures with a more efficient use of work time.¹⁶ In addition to having to provide space, train employees and modify their work flow, the primary care provider typically has to make the largest investment in equipment and training. Development of mechanisms to share equipment and training costs between specialists and primary providers may be needed to realize the full potential of the telemedicine application.¹⁷

- Depending on who pays for patient travel, innovative ways to share the travel cost savings may also be needed. For example, some patients may prefer to travel to receive specialist care in person, especially if the primary provider pays for patient travel. If a third-party payer pays for patient travel, new incentives may be needed in third-party reimbursement schedules to encourage patients to take advantage of the cost savings that telemedicine may offer to the system as a whole.
- Since telehealth increases efficiency of specialists' time, it provides specialists with an opportunity to expand their consulting network. They may need to invest significant time building their referral networks and developing a comfort level among primary care physicians in order to generate new referral cases.
- Telehealth has the opportunity to reduce leakage of referrals outside the local or regional health care system. This can be one selling point for primary care providers who are concerned about maintaining sufficient revenues to cover their fixed costs.. On the other hand, counting the reduced leakage as system revenue without acknowledging the redistribution from the outside provider overstates the gains to society as a whole. Nevertheless, a substantial patient travel savings often accompanies the reduction in outside leakage.
- In addition to reducing bypass of the local primary care provider, the retention of local patients may also enable the local facility to provide ancillary services it would not have otherwise been able to provide, increasing their ability to cover their fixed costs.¹⁸

TELEHEALTH AND THE PRACTICE OF MEDICINE

There are a number of issues related to the introduction of new technology into the practice of medicine. One must recognize that telehealth is part of a complex set of personal and professional relationships among providers and patients, and human factors ultimately determine whether an innovation “fits.” Some of the specific issues are:

¹⁶ Based upon our interviews with specialists, we believe that the specialists who are providing e-mail consults who are able to do their consults on a batch basis once a day are able to achieve significant productivity gains compared to in-patient consultations – on the order of 20% or more consultations per unit of time. We also acknowledge that the productivity gains reported by specialists in store and forward systems may not be as easily achievable in live consultation settings. See for example, Loane, et al, “Patient cost-benefit analysis of teledermatology measured in a randomized control trial”, *Journal of Telemedicine and Telecare*, Volume 5, Supplement 1, 15 March 1999, pp. 1-3(3).

¹⁷ We note for example, that specialists or centralized hubs that coordinate specialists may find it advantageous to purchase, install and train the primary care providers and charge them on a per-unit of use basis for the specialist consults to reduce their up front investment and assume the risk of a longer term payback as the tele-consult volumes take time to develop.

¹⁸ See Stacey Cole, “The Financial Impact of Telemedicine”, University of California, Davis, Center for Health and Technology, at www.atmeda.org/news/2005_presentations/w1b1.Cole.ppt

- Movement to digital records. Telehealth is a smaller step for an office that has moved to digital medical records, and a smaller step still for one that uses digital imaging technologies.
- Provider acceptance. Sometimes this involves overcoming technophobia. In general the specialist must be able to demonstrate that a telehealth consultation provides an equivalent or better standard of care.
- Adequate training and skill maintenance. Like all technologies, there is likely to be substantial “learning by doing.” The greater the frequency of a use of telemedicine equipment in generating cases, the less it will cost in skill maintenance and quality control. The business model captures the volume that is required to demonstrate the financial viability of telehealth, but there may be a different volume required to ensure specialists that the equipment is being used properly by the originating site to capture clinical data, without loss of critical information.
- Too much bother. Primary care practices are often overscheduled and crowded. The primary practitioner may feel “way to busy” to deal with the added time of generating a telehealth case.
- Patient acceptance and satisfaction. Patients may also have technophobia, or value the face-to-face contact with physicians. Lack of patient satisfaction may cause leakage from the system, or the perception among providers that leakage may occur.
- Telehealth may affect provider satisfaction and offer new opportunities for professional development.
- Queuing, control of case flow. Primary care providers need to be assured that they will not lose control of their cases by setting up telehealth consultations for patients with specialists.

CONCLUSIONS

While each primary care provider site and associated system of referrals may have unique circumstances, we offer the following list of key considerations that have a tendency to drive the long-term financial results of a telehealth business model:

- To what extent are patients currently bypassing the primary care provider to receive specialty care and how much of that bypass will be recaptured by providing telehealth specialty consults (bypass recapture)
- To what extent are patients who are currently being referred to distant specialists going to be more effectively triaged and stay at the local primary care facility for treatment and follow-up services (travel savings, potential growth in ancillary services at primary care)
- To what extent are traveling specialists or mid-level specialists, e.g., audiologists, specialty nurses, available to either complement or substitute for telehealth consults with specialists (complementary/substitute services)¹⁹

¹⁹ See for example, “Telemedicine and the ‘Future Patient’? Risk, Governance and Innovation,” Carl May, et al, Economic and Social Research Council, U.K., March 2005, where “electronically mediated doctor-patient interactions are being rapidly displaced by applications that involve a wider range of staff (mainly nurses) utilizing systems explicitly intended to manage the routine trajectories of chronic diseases.”

APPENDICES

Financial Template Overview & Users Guide

Proposed Website Deployment

FINANCIAL TEMPLATE OVERVIEW AND USERS GUIDE

The Telemed Financial Template, Telehealth Cart, version 3b, dated 31 March 2006, is an Excel Workbook consisting of 69 individual spreadsheet tabs.

The workbook is organized into six main sections:

- Introduction, Potential Applications and Notes
 - Illustrative Cases
 - Sensitivity Analysis
 - Assumptions & Results (a.k.a. “The driver’s seat”)
 - Incremental Cash Flow Calculations
 - Backup sheets of assumptions, financial results, and referral patterns for the illustrative cases
1. The first tab in the workbook is the INDEX which provides hyperlinks to the remaining 74 individual spreadsheet tabs.
 2. The second tab in the workbook, “Intro,” provides an introduction to the financial template and describes the overall design philosophy behind the template and the focus on net present value cash flow from the perspective of providers, payers, and patients.
 3. Tabs three, four and five provide a graphic flow chart and verbal description of potential applications for the template – including two nodes, patient travel only or patient + specialist travel, and both patient and specialist travel to an intermediate third node.
 4. Tab six documents the items that were included and excluded from the incremental cash flow analysis and the incremental cash flow analysis + the estimated value of patient time
 5. Tab seven describes the net zero effect of rolling up the payments from insurance providers to health care providers for procedures and the income to providers for those same procedures
 6. Tab eight describes color code conventions in the spreadsheets.
 - 6.1. Please note that many of the blue font cells are linked to sliders. Please use the slider to maintain the integrity of the spreadsheet logic.
 - 6.2. Where there is a blue font cell that is not controlled by a slider, it is designed to be adjusted by the user.
 7. Tab nine describes the basic data flow through the financial template beginning with user entry of assumption in the “Assumptions and Results” tab (tab 49).
 8. Tab ten offers some general observations concerning the illustrative cases and notes on the potential differences between a small, single practitioner specialty office and a group practice.
 9. Tabs eleven (11) through thirty-one (31) provide annual and cumulative cash flow graphics for each of several perspectives included in the results (primary care, specialist, insurance payments

to providers, travel costs, telecom universal service fund, and a total system perspective). A few highlights:

- 9.1. Tab 16 – Total System Perspective for Remote Rural Illustrative Case
 - 9.2. Tab 18 – Total System Perspective + Patient Time Value for Remote Rural Illustrative Case
 - 9.3. Tab 24 – Total System Perspective for Underserved Population Case
 - 9.4. Tab 26 – Total System Perspective + Patient Time Value for Underserved Population Case
 - 9.5. Tab 29 – Total System Perspective for Itinerant Specialist Case
 - 9.6. Tab 31 - Total System Perspective for Reduce local bypass case
10. Tabs thirty-eight (32) through forty-eight (42) provide break-even analyses that examine the net economic cost/benefit from each perspective as the volume of telehealth consults increase under a number of different scenarios.
- 10.1. Among other things, these examples suggest that the results are sensitive to existing spare capacity and the potential for telehealth to create additional encounters requiring either a queue to form or lengthen or additional staff to be hired to meet the growing demand
 - 10.2. In addition, these examples suggest that an interesting base case against which to compare telehealth is not one where patients are routinely traveling to see a specialist in a hub community, but rather one where specialists are routinely traveling to rural communities on an itinerant basis. While some patients may have to wait a few weeks to see the specialist compared to next day service with a store and forward telehealth consult, the overall cost of the service for an itinerant specialist may be competitive with telehealth deployments under some circumstances. A key consideration is the extent to which patients or the primary care provider can discern when a case needs more immediate attention and the patient needs to travel to see a primary care doctor or a specialist.
11. Tab 43 is the Assumptions and Results “driver’s seat spreadsheet.” From here the user can specify the majority of the assumptions and see how those assumptions change the results in numeric and bar graph form.
- 11.1. After users skim the introduction, potential applications, notes and the illustrative cases, they are encouraged to modify assumptions and observe the results.
 - 11.2. Once a user becomes familiar with the model and is ready to save particular assumption sets for future reference, one quick method is to create a copy of the “Assumptions and Results” sheet, a.k.a., ARO tab, label it ARXXX, XXX being a user designated letter or number code, then copy the ARO assumptions sheet and paste it as values with formats on the new “saved assumptions” ARXXX page for future reference. See for example tabs 67-71.
12. Tab 44 contains the financial roll-up of revenues, costs, net annual cash flows, present value of net annual cash flows, and cumulative present value of net annual cash flows for each perspective. In addition it provides a calculation of the incremental cost per patient from the

primary care provider and specialist perspectives. The totals at the bottom provide the basis for the graphs.

13. Tab 45 contains a simplified referral flow chart along with the detailed referral statistics (without, with, and incremental) for year one.
14. Tab 46 extends the detailed referral statistics from year one through year five.
15. Tab 47 (four page print out in its entirety) contains the summary and detail of the referral statistics, revenue and cost information from the perspective of a **primary care provider**.
16. Tab 48 (page 51) contains the cost tables for the **primary care provider**, including fixed labor costs, number of personnel and associated capacity of the personnel in relative value units. The cost tables also provide for a variable labor component to be determined by the user.
17. Tab 49 (four page print out in its entirety) contains the summary and detail of the referral statistics, revenue and cost information from the perspective of a **specialist** receiving referrals from the primary care providers.
18. Tab 50 (page 56) contains the cost tables for the **specialist**, including fixed labor costs, number of personnel and associated capacity of the personnel in relative value units. The cost tables also provide for a variable labor component to be determined by the user.
19. Tab 51 (page 57) contains the incremental cash flows associated with Universal Service Fund supported rural health care T-1 circuits. Note that the cost attribution percentages are assumptions which are designed to be controlled from tab 49 – the assumptions and results tab.
20. Tab 52 (page 58) contains the incremental cash flows associated with insurance/patient payment to providers for incremental procedures along with the calculation of the incremental patient travel savings.
21. Tab 53 (page 59) contains the financial roll-up of revenues, costs, net annual cash flows, present value of net annual cash flows, and cumulative present value of net annual cash flows for each perspective *plus the perspective of the time value to patients*. In addition it provides a calculation of the incremental cost per patient from the primary care provider and specialist perspectives. The totals at the bottom provide the basis for the graphs.
22. Tab 54 (page 60) contains the calculations concerning the time value of patients (and their parents) due to time lost associated with travel that could have been avoided and the value to patients of reduced wait time in the queue for a specialist.
23. The balance of the tabs 55 – 69 contain the “saved assumptions, cash flows, and referral patterns for the illustrative cases.

WEBSITE AVAILABILITY

This report and the accompanying Excel spreadsheet are available at: www.iser.uaa.alaska.edu and query in our publications search using the title of this document “Telehealth Business Models”.