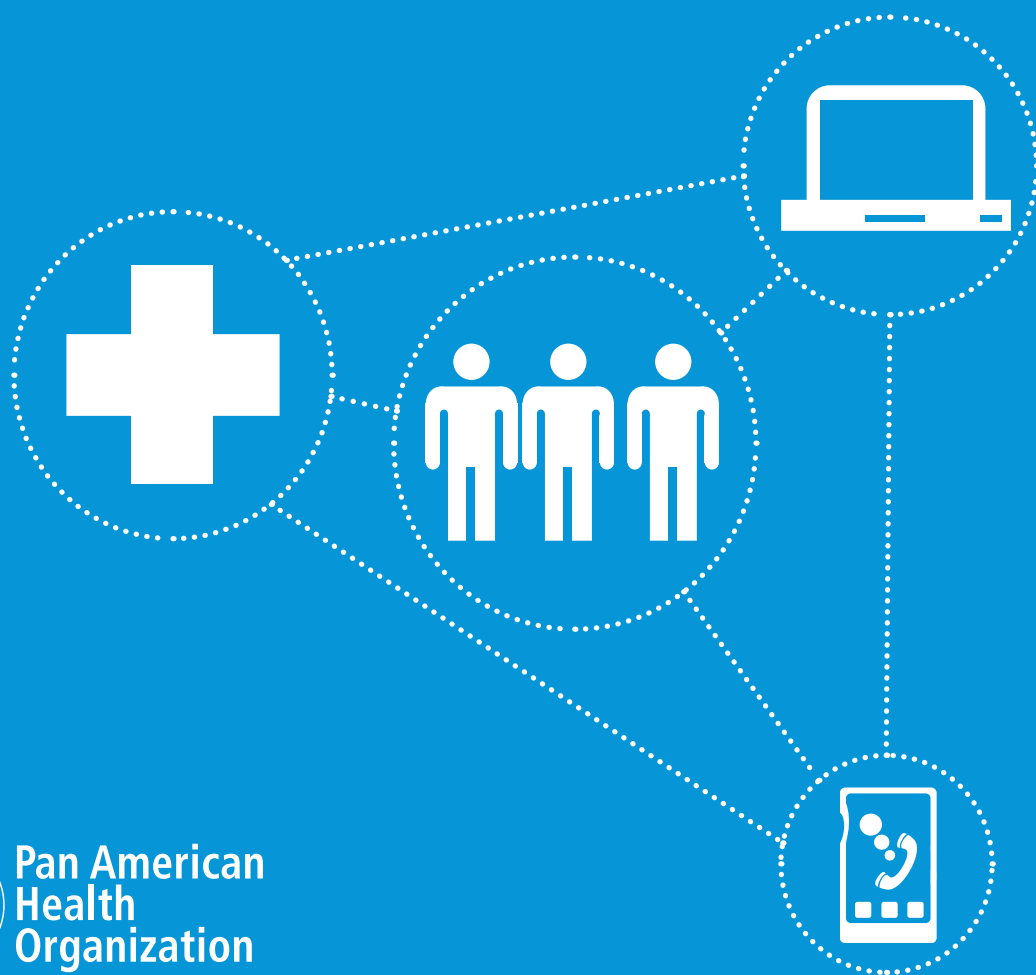


# Defining evaluation indicators for telemedicine as a tool for reducing health inequities

Study and results of a community of practice



Pan American  
Health  
Organization



World Health  
Organization

REGIONAL OFFICE FOR THE Americas



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Americas

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## Summary

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This report presents the opinion of participants in a discussion forum on “Defining Evaluation Indicators for Telemedicine Projects,” convened by the Pan American Health Organization, and held in April and May 2015. In all, 52 people from at least 13 countries in Latin America were registered in the introductory forum. The participants were very clear on the variety of definitions of telemedicine and on the implications of its inclusion in the term “telehealth”. The greatest benefit discussed was “access and timeliness”. They thought that telemedicine projects were not and should not be understood simply as technology projects, but rather were health interventions that relied on and/or used information and communications technologies (ICTs) for service delivery. For the participants, the differences and similarities between telemedicine and health services not provided through ICTs were that, while both basically were health services, the interface created a new paradigm both for the user and the beneficiary. They found that the greatest challenge in terms of evaluation was the lack of knowledge on use of telemedicine, which hindered the development of reliable evaluation indicators. Another challenge was that evaluation should occur in every phase of the project, both comprehensively and in individual processes. The participants thought that early phases of telemedicine projects should be evaluated systematically, mainly with regard to feasibility and acceptability. They considered it important to measure the health impact of telemedicine projects despite the difficulties inherent in the complex multicausal processes typical of this type of project.



## Introduction

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Telemedicine is defined as the “delivery of health services at a distance including the components of promotion, prevention, diagnosis, treatment, and rehabilitation, provided by health professionals who use information and communications technologies to enable the exchange of data. The aim is to facilitate access and timeliness in the delivery of services to the population with limited supply and/or access to services in their geographical area. The above does not relieve health care providers and third-party payers from prioritizing the delivery of personalized health care in the framework of the General System of Social Security in Health”[1]. However, despite the development of different strategies and public policies in health to promote its use[2], ultimately implementation of telemedicine is not exempt from the challenges and difficulties often associated with the need for clinical evidence of its benefits and how cost-effective it is. This no doubt has an impact on the perception of the different interest groups[3]. Telemedicine has a notable diversity of uses, but in particular it allows for asynchronous encounters[1]. That is, it permits communication between the provider and the beneficiary in real time.

Despite the major possibilities and applications of telemedicine, rigorous evaluations of telemedicine projects are needed. Firstly, due to financial sustainability challenges facing health systems (which does not preclude them from investing in health interventions) and secondly, because of the lack of sufficient clinical evidence on such projects. Accordingly, the evaluation needs to be a planned process capable of determining the viability of the project and its impact[4]. In addition, developing the evaluation indicators should be an integral part of planning and conducting the evaluation.

## Objective

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The objective of this report is to disseminate the results of the discussion of the Community of Practice during the April/May 2015 forum on the definition of evaluation indicators for telemedicine projects.

## Methodology

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Participants' contributions were analyzed qualitatively by conducting a review of the discussions in the online forums. The characteristics of the participants who indicated an interest in the project were also analyzed.

### Preparation of the forums and invitation to participants

A bulletin was prepared to invite participants and to explain the purpose of the project, which was disseminated through PAHO's regular channels of communication. During participant registration, demographic data was obtained (e.g., first and last name, country, and workplace).

The data was collected through an online form and stored in the database on PAHO servers.

The structured data in the database were used for the analysis and description of participants, and their contributions in the forum were reviewed manually.

### Data analysis

A quantitative description of participants' countries of origin is provided according to what they reported in the introductory forum. Through the information that participants shared, the types of organizations were classified according to whether they were involved in software development, or belonged to private companies, government entities, universities and/or research centers linked to a university. All participant contributions were made in an individual capacity and did not necessarily represent the opinion of the institution with which the participants were affiliated. Any information shared that did not reference a country or organization is represented as "No Data". The data were compiled using Microsoft Excel 2010.

To analyze the content generated by the participants and available in the forums, each thematic forum was read, and key phrases from each one were selected and listed in a spreadsheet. The presence of patterns and common subjects was then confirmed.

Once the common themes were identified, search terms (key words and/or phrases) were chosen as a double review mechanism and searched to confirm the frequency of the patterns.

The results were interpreted by trying to develop a single logical line according to the patterns found and their frequencies. Some phrases taken directly from the forums were used to illustrate the points. Some spelling-related edits were made to such phrases.

A draft of the preliminary results was sent to the project coordinators who had initially participated in generating the topics of discussion, for their review and comments.

## Results

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### Participant data

A total of 52 people from at least 13 countries were registered in the introductory forum. The countries with the greatest representation were Mexico (19), Colombia (6), and Peru (5). The two types of organizations with the greatest representation were government (21) and university (13). The forum presented 183 messages in six groups. The highest participation was in the forum on technical questions [Spanish], with 120 messages. In the introductory forum, the countries of origin of participants in the Community of Practice were compiled, together with the organization to which they belonged. Table 1 shows the number of participants, by country.

**Table 1:** Number of participants, by country of origin

Argentina	1
Bolivia	1
Brazil	3
Chile	1
Colombia	6
Cuba	1
Ecuador	2
Honduras	1
Italy	1
Mexico	19
Peru	5
Uruguay	2
Venezuela	1
No data	8
<b>Total</b>	<b>52</b>

Table 2 shows the number of participants, by type of organization or occupation, based on the type of information shared. Participants were not initially asked to classify themselves in this way, which creates a limitation when trying to accurately associate institutions with participants.

**Table 2:** List of participants, by institution

Software developer	3
Company	4
Government	21
Hospital	8
University	13
No Data	3
<b>Total</b>	<b>52</b>

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## Subjects discussed by participants

In general the subjects selected by the coordinators were respected in the discussion process; some topics not identified by the coordinators gradually emerged and were added in the “Results” section.

### Homogenizing the Concept. What is Telemedicine?

Considering the WHO definition of telehealth and telemedicine, identify key features of telemedicine.

What are the main benefits of telemedicine: coverage, access, or quality of care?

The participants agreed that a wide range of definitions of telemedicine exist, in general, telemedicine could be included within the conceptual framework of telehealth. Telehealth is the linkage of telemedicine, health education and health administration processes.

The actions identified (also expressed as modalities) were the remote physician-patient relationship. In this regard, they underscored the importance of also including other health workers in this remote service activity; to that end they recommended “interconsultation” services and highlighted their application in telediagnosis:

*“In a basic teleconsultation there does not necessarily have to be a physician on the consulting side, but rather a paramedic, nurse or telemedicine/telehealth technician”*

However, participants also noted that:

*“While paramedics or nurses can give the consultation, there is no legal backing for this”.*

The greatest benefits identified by the participants were: firstly, access to health services, particularly to medical specialties; and secondly, timely delivery of services. In contrast, participants noted the difficulty of analyzing opportunity cost since telemedicine is not an isolated service. However, participants also considered that:

*“Depending on the context and the actual resources of the telemedicine program, it can provide greater support for coverage and access to care, or improve the quality of care”.*

Participants clarified that one of the advantages of telemedicine was to allow for a second opinion from a health professional in a specific case. In addition, telemedicine involves a new subjectivity due to the impact of technologies in medical practice.

One of the challenges of developing definitions in this field, is that

*“Definitions, concepts, and other theoretical elements that try inclusively to achieve consensus have at times become excluding factors.”.*

### Technological Health Projects vs. Health Care

Is telemedicine a technology project?

What percentage or to what extent should we incorporate a technological vision in a telemedicine project?

In general, participants were of the opinion that telemedicine was not only a technology project but, first and foremost, a health project and that it should derive from a framework of public and health policies with a special focus on the use of telemedicine. Consequently, they proposed that the

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evaluation indicators should go much further than merely evaluating the technology used. That is, the technology was just the medium used.

At the same time they noted that:

*“There are already too many detractors and skeptics of telemedicine ... so the approach from the outset should make it clear that the technology is just an instrument”.*

Participants also noted that the difficulty implementing it was due more to *“the magnitude and the impact it has on the processes of health professionals.”* They also clarified that global health needs should initially be considered, together with *“the centralization of health systems, lack of access to health in all its terms, etc.”.*

In addition, telemedicine should be humanized as much as possible to reduce the much-criticized loss of the physician-patient relationship. Moreover, health policies related to the use of technologies should focus on collaboration between universities and entrepreneurs (technology developers), and on being cost-effective, if the aim is to make the process sustainable. There needs to be adequate technological vision so as not to reduce the impact of the proposed strategies. Universities could also participate in developing pilot projects that, among other things, are theoretically easier to monitor.

### Major Differences between a Telemedicine Project and Conventional Health Care Projects

If telemedicine is a medical process with technological support, what makes it so different from a “normal” care process?

Is it necessary to consider telemedicine as a different medical process?

Participants suggested that there are various conditioning factors that make telemedicine similar to a “traditional service” but, at the same time, there are other factors that distinguish it.

*“We could compare it with asking: When we talk on the telephone (versus in person), are we talking? The answer is yes. It is the form of interaction that changes”.*

Thus, what they both share is that they are health care processes; how they differ is in their form of interaction, which can create the perception that the telemedicine process is not established. Also a significant difference is the legal backing that traditional services have as compared to telemedicine services. Participants also noted that, in some cases, implementing telemedicine involved changing how processes were carried out and modifying the associated health care documentation. However, examples were provided in which the changes were only minor.

The group concluded that telemedicine was both an alternative to a given service and, at the same time, has the potential to complement that service. Telemedicine was not considered a different process and considering it a completely different process only exacerbated doubts about telemedicine. In any case, they recommended measuring the possible change in flows and processes that telemedicine could have in health services delivery.

### Evaluation Goals in Telemedicine

What are the main challenges for the evaluation of telemedicine projects?

Should we demonstrate benefits? Or make improvements?

Participants suggested that in order to evaluate a telemedicine project, it is necessary to determine the limitations of the project, adopt strategies to overcome them, and establish a comparative framework. Another challenge involves knowledge and experience in the use of telemedicine, which

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hinders its evaluation. Lastly, they mentioned the importance of “*preparing a simple, concise, complete, inexpensive, and applicable instrument for modest projects up to megaprojects*”. Consequently, it was recommended that the evaluation model should, in particular, demonstrate that conditions are the same as in the in-person modality. .

The foregoing suggests that, ultimately, different aspects of telemedicine projects are evaluated that should be considered both individually and comprehensively. In this regard, participants suggested evaluations to establish, for example, performance, user satisfaction, quality of services offered, and/or the cost-benefit. This makes it necessary to determine the difference between the alternatives, the level of acceptance by patients, and how replicable and scalable it is, among other things.

One example proposed was using telemedicine under the macro concept of telehealth to provide training. This makes it possible to develop an effectiveness indicator. However, participants noted that an indicator of appropriateness required evaluating knowledge, using the different modalities before and after having implemented the training. Thus, it is difficult to make the association between the training (remote or not) and its direct impact on service delivery.

It is also important to demonstrate the benefits, since this makes it possible to address the difficulty with change that health service providers have. The following evaluation indicators were suggested:

Short-Term:

- Increase in number of specialties per offering unit (to measure acceptance among physicians and hospital administrators)
- Increase in teleconsultations held (to measure the progress in the health system)
- Patient savings (to measure the financial impact on patients)
- Time from when a teleconsultation is requested until it is held (to measure telemedicine’s advantage over regular referrals and the time it saves in patient care)
- Satisfaction questionnaire
- Wait time between the scheduled time and the teleconsultation
- Number of teleconsultations in a given period

Medium-term:

- Relationship between teleconsultations held and the relative drop in regular consultations
- Hospitals taking part in telemedicine out of the national total.
- Number of deferred teleconsultations.
- Number of hours not used or free.
- Number of technical problems per unit
- Time taken to resolve technical problems per unit.

Long-term

- Number or percentage of patients being monitored by telemedicine.
- Improvement in monthly consultations over previous years.
- Average savings over previous year.”.<sup>1</sup>

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1 - Modified from the original. The titles were kept, but the content deleted.

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## Monitoring and Evaluation

What should be assessed?

What are the priorities for evaluation?

The participants suggested that the evaluation process should be present from the outset of the telemedicine project. That is, that different aspects should be monitored and evaluated individually and collectively. This leads to the conclusion that everything should be evaluated.

*“Everything that typically is assessed in a project: macro aspects such as sociocultural, economic, political, legal, technological infrastructure i+R&D, and ecological considerations. At the sector level: providers, competitors, substitutes, entry barriers, market forces, role of academia, role of medical associations, role of regulators, acceptability to patients and community, role of telecommunications companies, degree of interoperability and scale-up in the health system, role of health authority with respect to eHealth, degree of prehospital development, primary health care, ambulatory services, hospital services, rehabilitation, etc. Micro aspects of the project: strengths, weaknesses, opportunities, threats; financial, technical, political, and social feasibility; social responsibility, etc.”*

*“Process indicators in several aspects: before, during, and at completion: acceptability (to physicians, patients, managers, health care personnel), technological scalability, continuity of care, response capacity, etc.”*

Participants clarified that the priority and/or desirability is determined by the project's degree of progress. That is, a project in the early phases should focus its evaluation on attaining the initial objectives and on how the strategies are aligned with the targets. In implementation phases, the focus should be on optimizing processes and technologies and, lastly, in an established project, on the social and economic benefits.

## Stages of a Telemedicine Project

Does the monitoring occur throughout the project? In the early stages of implementation what kind of indicators should we have?

How do we determine if we are meeting the objectives of the initial project?

Participants recommended that in the early stages it was necessary to determine how feasible the project was, its acceptance by stakeholders and the degree of sensitization of the authorities and decision-makers. As mentioned earlier, these indicators should be consistent with the degree of acceptability, access, adaptability, reliability, and technological capacity, among other things.

Thus, participants suggested the following variables to be measured:

- *Project feasibility*
- *Acceptance by professionals.*
- *Sensitization of authorities and decision-makers*
- *The technical capabilities of users*
- *Its cost, benefits, efficiency, and effectiveness*
- *Accessibility, acceptability both by the patient and by health workers*
- *Attainment of the proposed, desired, and expected objectives and achievements.*



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According to participants, the review should be systematic, so as to determine with certainty whether or not the proposed objectives were achieved. It was suggested that the Balanced Scorecard, for example, be used to develop indicators.

Finally, indicators should have characteristics, such as “*knowing what it wants to measure, being comparative, having a certain frequency of measurement, and being clear, precise and self-explanatory*”.

### Proposal and Construction of Indicators

What indicators of effectiveness can we implement?

What indicators of quality can we implement?

What indicators of efficiency can we implement?

What endogenous and exogenous indicators will be appropriate to include?

The participants proposed a series of indicators, detailed below.

Timeliness indicators:

- *Number of patients who need to be transferred / Number of patients transferred*
- *Number of physicians in the remote unit / Number of physicians trained last year*
- *Number of medical specialties in the remote unit / Number of medical specialties in the referral unit*
- *Transfer time to the remote unit / Transfer time to the referral unit*

Effectiveness indicators:

- *Number of patients seen after the telemedicine program was implemented, compared with the number of cases before implementation for a given period.*
- *Number of accessible specialists after the telemedicine program was implemented, compared with the number before implementation for a given period.*
- *Number of persons with disabilities or physical, economic limitations etc. that have had access to specialized care through the program.*

Quality indicators:

- *Number and diversity of specialists since the program was established*
- *Stability and reliability of the system and method used to transmit information*

Efficiency indicators

- *Monitoring costs*
- *Patient perception*
- *Access*
- *Coverage*

Endogenous indicators

- *Coverage*
- *Trained technical personnel,*
- *Necessary equipment and supplies*
- *The experiences reported by patients.*

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Exogenous indicators

- *Medical effectiveness*
- *Service access*
- *Costs of medical care.*

Participants questioned and clarified the definitions of “endogenous” and “exogenous” and explained that the definitions depended on the “taxonomy used”.

### Feasibility and Frequency of Measuring Indicators

In your experience, how frequently should indicators be measured?

Frequency varies not only between indicators, but, for each indicator, situations might arise that require a change in frequency. To make adjustments, the evaluation team that established the indicators should have full knowledge of the project and the use and application of the indicators, so that it can make the appropriate modifications to the frequency as dictated by circumstances.

One of the participants mentioned the case of a telehealth service that covers more than 700 cities in Brazil. The production, quality and economic indicators are evaluated monthly. More detailed studies are conducted annually. Audits are scheduled both semiannually and annually.

### Official Sources of Information

How should new projects be incorporated into official sources?

How can telemedicine features and data be identified using information systems?

Participants mentioned that the novelty of the projects limited the level of interest and participation of the sectors in which it could be implemented. Consequently, it should be understood that this process can be slow and demands patience on the part of the group in charge of implementation; the evaluations and indicators should be prepared taking into account this challenge. They concluded that it was essential to develop a strategy that determined “the mechanisms and administrative logistics to make the actions “legitimate” for subsequent evaluation.”

With respect to how new projects should be incorporated into official sources, the following recommendations were made:

- *Clearly define what is going to be measured*
- *Have evidence that backs the information you want to measure*
- *Make the corresponding arrangements with the authorities in charge of the country information systems*
- *Put forward clear proposals with the variables to be measured*
- *Build a consensus at the operating level around whether this is what should be measured*
- *Establish formats*
- *Get consensus on format*
- *Implement a pilot project*
- *Establish official forms*
- *Give training in use of the forms*
- *Implement them at the national level*

Finally, countries with a regulatory framework for telemedicine are more likely to already have sources of information in the information systems that may be useful for a given telemedicine project.

## Additional

Should we measure health impact?

What indicator is most representative of telemedicine projects?

How can savings be identified in telemedicine health projects?

Sare reflected below.

Participants believed that the health impact of telemedicine should be measured, since *“This would be the thermometer to gauge firsthand how useful, beneficial, and efficient the tool that we are using is”*.

Participants also noted the difficulty of assessing the health impact of the technology, since *“there are multifactorial aspects that affect the proper determination of these results.”*

With respect to indicators most representative of telemedicine projects, the participants pointed out that one such indicator was access, i.e., the number of beneficiaries of health services using the telemedicine modality. Another indicator to consider was the perception of the quality and benefits of telemedicine, as well as process indicators such as quantity and type of services provided and number of people trained. Lastly, indicators informed by the framework of health economics should be considered.

Regarding how can savings be identified in telemedicine health projects, participants proposed an approach focused on improving health services. One criterion could be the reduction in treatment times through the use of telemedicine and, as a result, *“the savings derived from this time gain.”* In line with the health economics conceptual framework, there should be a cost-benefit and cost-utility estimate, such as out-of-pocket expenditures and evaluation of price and quality, among other factors. .

## Proposed Primary Indicators

Primary indicators for telemedicine programs were proposed (detailed below), and participants were asked to analyze and provide feedback.

The participants agreed that the list was well formulated and covered many points of interest. However, they also suggested the possibility of including economic indicators and indicators for specific services, such as tele-education. Others recommended indicators including: rate of utilization, teleconsultations carried out per point of service, and effectiveness of service.

**Table 3:** Indicator file: Program coverage

Indicator	Program coverage		
<b>Description:</b>	Percentage of localities (municipalities, housing units, populations) that have telemedicine service, out of the localities originally proposed in the program.		
<b>Interpretation:</b>	According to our program plan, this measures the degree of progress in implementation.		
<b>Fórmula:</b>	Number of localities served by telemedicine x 100/Number of localities that make up the program's target population.		
<b>Frequency:</b>	Semiannual.	<b>Type of Indicator.</b>	Demographic.
<b>Observations:</b>	It is necessary to identify what is considered a telemedicine service. Additional information can be obtained, such as the population that would potentially benefit from the program.		

Table 4: Indicator file: Hours available for teleconsultations with specialists

Indicator	Horario disponible para teleconsultas de médicos especialistas		
Description:	Establishes the supply of telemedicine consultations available in the program.		
Interpretation:	Total number of possible hours that physicians have for patient care using telemedicine.		
Fórmula:	Sum of total hours available for teleconsultation by specialists x 100/total available hours by the specialists.		
Frequency:	Monthly.	Type of Indicator.	Performance.
Observations:	This indicator can be incorporated into other measurements: Increase in hours available to specialized physicians for telemedicine consultations. Comparison with total hours for in-person consultation. Comparison with actual hours of consultations.		

Table 5: Indicator file: Program not operating because of technical issues

Indicator	Program not operating because of technical issues		
Description:	Number of hours or days the program does not provide services due to a technological or operating issue.		
Interpretation:	The indicator should be as low as possible and shows the result of not having contingency and prevention plans for unexpected, primarily technology-related, events.		
Fórmula:	Total hours the program is not operating because of technical issues x 100/total hours of care.		
Frequency:	Monthly.	Type of Indicator.	Effectiveness.
Observations:	There needs to be a service logbook. This indicator may relate to various technical or procedural issues, such as videoconference equipment or Internet network failures, or lack of specialized physician for logistical reasons. It complements the consultations held/scheduled ratio.		

Table 6: Indicator file: Teleconsultations held

Indicator	Teleconsultations held		
Description:	Successful consultations using telemedicine to see patients.		
Interpretation:	Determines the effectiveness of program logistics.		
Fórmula:	Number of teleconsultations held x 100/Number of teleconsultations scheduled.		
Frequency:	Monthly.	Type of Indicator.	Effectiveness.
Observations:	It must be determined what is considered a successful telemedicine consultation. Indicator related to transfers avoided, since regular consultations would necessarily involve transferring the patient. This indicator can show the reasons for cancelled consultations (human, technical, operational, administrative, logistical).		

**Table 7:** Indicator file: Transfers generated through telemedicine

Indicator	Transfers generated through telemedicine		
Description:	Refers to the number of hospital transfers, after a teleconsultation, due to medical complications.		
Interpretation:	Determines the number of patients admitted to hospital as a result of a teleconsultation; monitors the number of transfers generated with teleconsultations, and confirms a reduction in these.		
Fórmula:	Number of transfers of patients seen by teleconsultation x 100/Number of patients seen by teleconsultation.		
Frequency:	Monthly.	Type of Indicator.	Impact.
Observations:	Indicator related to avoided transfers; the teleconsultation itself can be considered an avoided transfer; in order to measure program effectiveness, this indicator should trend downwards.		

**Table 8:** Indicator file: Subsequent telemedicine appointments

Indicator	Subsequent telemedicine appointments		
Description:	Determines the average number of subsequent appointments generated based on the first appointment, per patient.		
Interpretation:	Indicates that the patient's problems are being addressed.		
Fórmula:	Number of subsequent telemedicine appointments per patient x 100/Number of patients seen for the first time with telemedicine.		
Frequency:	Monthly.	Type of Indicator.	Quality.
Observations:	This should be related to the type of specialty provided.		

**Table 9:** Indicator file: Wait time for teleconsultation

Indicator	Wait time for teleconsultation		
Description:	Refers to the time that elapses between when an appointment is scheduled and when it is held.		
Interpretation:	Determines the average patient wait time. Evaluates the time the patient saves through teleconsultations with respect to normal care. An ex post comparison is needed.		
Fórmula:	(Sum total of hours elapsed between when the appointment is scheduled and when it is held + Duration of the appointment in hours)/Number of teleconsultations held.		
Frequency:	Weekly.	Type of Indicator.	Quality.
Observations:			

**Table 10:** Indicator file: Specialty consultations by telemedicine

Indicator	Specialty consultations by telemedicine		
Description:	Measures the number of consultations by specialty.		
Interpretation:	Helps to determine the demand for consultations.		
Fórmula:	Sum of consultations per specialty using telemedicine x 100/Total number of consultations using telemedicine.		
Frequency:	Monthly.	Type of Indicator.	Performance.
Observations:			

**Table 11:** Indicator file: Patient satisfaction

Indicator	Patient satisfaction		
<b>Description:</b>	Determines the satisfaction of patients seen using telemedicine.		
<b>Interpretation:</b>	Determines the perception of the user after using telemedicine services. Helps to improve the operation of the program.		
<b>Fórmula:</b>	<b>Number of satisfied patients x 100/ total patients served using telemedicine.</b>		
<b>Frequency:</b>	Monthly.	<b>Type of Indicator.</b>	Quality.
<b>Observations:</b>	A simple satisfaction survey is needed, based on responses on the Likert scale. It can be also used for physicians.		

## Discussion

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The participants were very clear about the variety of definitions for telemedicine and the implications of its inclusion in the term “telehealth”. The greatest benefit mentioned was “access and timeliness”. They also thought that the projects were not nor should be seen simply as technological projects, but instead were health interventions supported by and/or using information and communications technologies (ICTs) for service delivery. That is, ICTs should be understood as the means and not the objective. For participants, the differences and similarities between telemedicine and health services not provided through ICTs are that, while both basically are health services, the mode of interaction does create a new paradigm for both users and beneficiaries. This sometimes takes the form of changes in processes and activities associated with delivering health services. Nevertheless, the participants recommended not focusing on the differences. They thought that the greatest challenge for evaluation was the lack of knowledge and use of telemedicine, which limits the development of reliable evaluation indicators. They also noted the lack of evaluation instruments and recommended focusing evaluation on demonstrating the benefits of telemedicine compared to health services delivery without the use of ICTs. Participants thought that all phases of the project should evaluate both the overall picture and individual processes. They recommended setting priorities by type of interest group and degree of project progress. They thought that the early phases of telemedicine projects should be evaluated systematically, mainly with regard to feasibility and acceptability. They recommended a series of indicators of effectiveness, quality, and efficiency, together with endogenous and exogenous indicators, and noted the need to clarify the definition of both endogenous and exogenous indicators. The participants thought that the frequency of the indicators depended on the type of indicator and information source. Regarding official sources of information, in their view, the novelty of telemedicine projects hindered their incorporation into official sources. This should be handled with patience since the process of acceptance is slow. Participants considered it important to measure the health impact of telemedicine projects despite the difficulties inherent in complex multicausal processes. They also noted that access and perception was one of the best indicators for telemedicine projects. Finally, regarding the proposal of primary indicators in telemedicine programs they suggested that some be included, such as economic and specific service indicators and others.

## Limitations

The number of active participants was less than the number registered in the welcome forum. This may limit the generalization of the conclusions. Similarly, the qualitative analysis is limited by its methodological structure, which involved a review of the analysis using two different mechanisms and the subsequent validation of the content generated in the report.

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## Conclusions

Telemedicine offers great potential for improving health services delivery. However, implementing it and evaluating its impact are not without challenges and risks. This report documents and analyzes the discussions held by participants in the community of practice in the online forum, who made a series of recommendations and comments on various subjects associated with evaluating telemedicine projects. Furthermore, a list of primary indicators for telemedicine programs was developed. While this list may be modified, improved, and expanded, it is a first step towards proper evaluation.



# Bibliographic references



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1. Pan American Health Organization, “eHealth Conversations,” Washington (DC), 2014.
  2. Pan American Health Organization, “eHealth Strategy and Plan of Action (2012-2017) [Internet]. 51st Directing Council of PAHO, 63rd session of the Regional Committee of the WHO for the Americas; September 26 to 30, 2011,” Washington (DC), 2011.
  3. F. Roig and F. Saigí, “Dificultades para incorporar la telemedicina en las organizaciones sanitarias : perspectivas analíticas,” *Gac. Sanitaria*, vol. 23, no. 2, pp. 2–5, 2009.
  4. A. Martínez, R. Rodríguez, A. Infante, C. Campillo, and C. Gattini, *Bases metodológicas para evaluar la viabilidad y el impacto de proyectos de telemedicina*, Pan American Health Organization. Washington (DC), 2001.



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