Author's response to reviews

Title: Teleconsultation service to improve healthcare in rural areas: acceptance, organizational impact and appropriateness.

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BMC Health Services Research

Dear Editors

We are pleased to resubmit to BMC Health Services Research our manuscript with the new title:

Teleconsultation service to improve healthcare in rural areas: acceptance, organizational impact and appropriateness.

Enclosed a document that includes a point-by-point response to the comments provided by the 3 Referees and the Associate Editor.

We confirm that:

- the manuscript respects the Editorial Policies and the Instructions for Authors at http://www.biomedcentral.com/bmchealthservres/ifora/
- the manuscript is original, has not already been published in a journal and is not currently under consideration by another journal
- there are not any conflicts of interest

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This article is a very useful addition to the literature. Considerable faith has been placed by health service providers in the value of telehealth/telemedicine in overcoming some of the problems affecting under- or poorly-served populations and regions. To date, however, there has been a dearth of rigorous evaluation of the effectiveness of its utility in delivering care - much more has been written about its ‘potential’, or its demonstrated usefulness in transferring data and information, or for education and training purposes. This case study provides an excellent controlled study of the value of this medium for both providers of care and patients, so is a welcome addition. Additional information related to access has been added in Methods, Results and Discussion sections. Additionally, in healthcare, access can summarize a set of specific dimensions (availability, accessibility, accommodation, affordability and acceptability) describing the fit between the patient and the system [42, 43]. In particular, geographic accessibility has been measured through the number of inhabitants of the small communities where GPs receive their patients. Additionally, distances and travel times between those communities and the nearest healthcare provider where patients could receive visits or examinations, hospitalizations or Emergency Department admissions have been computed. The hypothesis of this optimistic scenario is that patients would actually access the nearest clinics. Finally, teleconsultations took place in 30 small rural communities, whose average population was 3,723 inhabitants. The average distance between the communities and the nearest healthcare provider, either a local outpatient clinic or a hospital, where patients could receive visits and examinations is 7.5±6.2 km, corresponding to 12.5±8.2 minutes of one-way travel. Additionally, the average distance between the communities and the nearest hospital equipped with an Emergency Department is 12.5±9.3 km, corresponding to 17.6±10.2 minutes of one-way travel. Since this optimistic scenario is based on the hypothesis of access the nearest clinics, and does not take into account common unexpected events (e.g. traffic), real distances and travel times could be greater. The relevance of the application is mainly linked to its possible widespread use that, in the present case, improved the access to healthcare for 812 patients living in 30 small rural communities [9]. However, Italy is a country where a teleconsultation service is mainly supplementary rather than specifically alternative. Benefits to geographical access could be higher in countries characterized by a greater distance between primary and secondary care.

<table>
<thead>
<tr>
<th>MINOR ESSENTIAL REVISIONS</th>
<th>No additional revisions are required here.</th>
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<td>This article is a very useful addition to the literature. Considerable faith has been placed by health service providers in the value of telehealth/telemedicine in overcoming some of the problems affecting under- or poorly-served populations and regions. To date, however, there has been a dearth of rigorous evaluation of the effectiveness of its utility in delivering care - much more has been written about its ‘potential’, or its demonstrated usefulness in transferring data and information, or for education and training purposes. This case study provides an excellent controlled study of the value of this medium for both providers of care and patients, so is a welcome addition. Additional information related to access has been added in Methods, Results and Discussion sections. Additionally, in healthcare, access can summarize a set of specific dimensions (availability, accessibility, accommodation, affordability and acceptability) describing the fit between the patient and the system [42, 43]. In particular, geographic accessibility has been measured through the number of inhabitants of the small communities where GPs receive their patients. Additionally, distances and travel times between those communities and the nearest healthcare provider where patients could receive visits or examinations, hospitalizations or Emergency Department admissions have been computed. The hypothesis of this optimistic scenario is that patients would actually access the nearest clinics. Finally, teleconsultations took place in 30 small rural communities, whose average population was 3,723 inhabitants. The average distance between the communities and the nearest healthcare provider, either a local outpatient clinic or a hospital, where patients could receive visits and examinations is 7.5±6.2 km, corresponding to 12.5±8.2 minutes of one-way travel. Additionally, the average distance between the communities and the nearest hospital equipped with an Emergency Department is 12.5±9.3 km, corresponding to 17.6±10.2 minutes of one-way travel. Since this optimistic scenario is based on the hypothesis of access the nearest clinics, and does not take into account common unexpected events (e.g. traffic), real distances and travel times could be greater. The relevance of the application is mainly linked to its possible widespread use that, in the present case, improved the access to healthcare for 812 patients living in 30 small rural communities [9]. However, Italy is a country where a teleconsultation service is mainly supplementary rather than specifically alternative. Benefits to geographical access could be higher in countries characterized by a greater distance between primary and secondary care.</td>
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<td>The paper is generally well-written, logically organised and the methodology clearly enunciated. The study builds solidly on existing literature and provides international coverage. The analysis is uncomplicated but sufficient to provide sound outcomes relating the impact of the teleconsultation service in terms of the four key criteria - access, effectiveness, acceptance and organisational impact. My main issue relates to the aspect of access. I think this is inadequately covered by the surrogate used (numbers using the service) and for that reason a little more caution needs to be taken in some of the statements extrapolating from the results of this study - eg: p11 ... successfully improved ... in small communities affected by geographic and socio-economic barriers” and p. 13: “The positive results reached ... and improve equal access to healthcare services”. As Pechansky and many others have shown, access is a critical and multifaceted dimension of health service provision, requiring consideration of service availability, accessibility, affordability, acceptability, accommodation etc (See for example editorial by McLaughlin &amp; Wysewianski in Health Services Research 37.6 December 2002). In the absence of more controls relating to the location of users, more caution should be used - alternatively, we need more detail - such as knowing whether those patients in the most disadvantaged locations or the most socio-economically disadvantaged were the main beneficiaries, or whether usage was greatest by those in locations already well served? Without locally available care (a GP) this medium was not going to be available and hence could not make any difference in terms of equity of access - see your reference on p12 to “In addition to the improvement in equity of access for remote areas...”</td>
<td></td>
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<td>Minor points: Numerous instances where expression could be improved - eg:</td>
<td>The text has been completely reviewed and English expressions improved.</td>
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<td>• p.1 - “Geographic location, in fact, often implies an unequal access to health care services [10], with socio-economic consequences even in terms of health and mortality [11] and negatively contributes to the recent rural-urban migration [12]” (I don’t understand this);</td>
<td>Geographic accessibility to healthcare services, in fact, is a major problem that affects rural areas [10], with consequent health and mortality inequalities [11] and rural-urban migration [12].</td>
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<td>• p.10 - 'The level of observance of the specialists’ suggestions by the GP (Q8) resulted to be very high...’ (i).</td>
<td>The agreement between specialists and GPs (Q8) was very high.</td>
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<td>• p.10 - sentence starting &quot;Although the GPs perceived different useful...&quot; is</td>
<td>GPs perceived useful benefits for all of the specialties, such as ease of use, timeliness and accuracy of</td>
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very long and confusing and should be broken up.

The service, reduction of waiting lists, transportation and costs. However, dermatological and diabetic teleconsultations had more barriers, such as the usual preference for face-to-face visits at the specialist’s surgery, which justify the lower adoption.

*p.11* - “However, the current indications of the Region of Lombardy just offer the teleconsultation service to GPs, excluding any reimbursement hypothesis” (?);

In fact, a reimbursement is recognized only to the specialists who provide the teleconsultation. On the contrary, GPs are not currently reimbursed.

*p.12* - I don’t understand the section in this sentence “In addition to the improvement on the equity of access for remote areas, which also helps contrast rural urban migration,…”

The sentence has been removed.

*p.12* - “However, some barriers and potential improvement leverages [30] emerged from the organisational analysis that was conducted to have more detailed information on the general practice” (?);

However, some barriers and potential improvement leverages [30] emerged from the organizational analysis of the general practice.

*p.14* - “…an inappropriate abuse of this service” (Is there an appropriate abuse?)

In fact, despite the evidence of the benefits that emerged in an experimental setting, a routine adoption would imply a correct monitoring of the level of utilization in order to ensure the appropriateness of the service.

Overall, this paper is a welcome addition to the literature.

Level of interest: An article of outstanding merit and interest in its field

No additional revisions are required here.

Quality of written English: Needs some language corrections before being published

The text has been completely reviewed and English expressions improved.

Statistical review: No, the manuscript does not need to be seen by a statistician.

No additional revisions are required here.

Declaration of competing interests:

I declare that I have no competing interests

No additional revisions are required here.

**REVIEWER 2: Dennis Pashen**

1. Major Compulsory Revisions - Nil
2. Minor Essential Revisions - Nil
3. Discretionary Revisions.

This paper is appropriately written and probably confirms much of the current literature about tele-consultation's acceptability to GPs/Family Physicians and the benefits derived from the use. I would have found it more valuable to have a dissection of:

1. the actual nature of the problems,
2. of which cardiology problems predominate,
3. the skills transfer from Specialist to GP which resulted,
4. cost savings and cost benefits to patient, potential reimbursement, costs to GPs and savings in Specialist care.

Consultation and patient numbers were adequate to gain an appropriate knowledge of the acceptability of the technology, however it adds little to the body of current knowledge on telehealth initiatives. Most of the outcomes achieved have been described in the literature over the past 15 years in the US, Australia and elsewhere.

1. Additional information has been added in Methods, Description of the Telemaco project.

Additionally, the project aims at contrasting the problem of appropriateness of access to secondary care. In fact, in Italy, Emergency Department admissions and in-clinic visits are often unnecessary and could be avoided, therefore improving waiting lists.

2. The main reason of the predominance of cardiac teleconsultations is related to the perceived utility, described in Results as an organizational impact (Table 1).

3. Unfortunately this study did not systematically monitor the skill transfer between specialists and GPs. The only result is related to the behavioral change described by data related to appropriateness of cardiac teleconsultations.

4. A paragraph Economics has been added, as also suggested by the associate editor. A description of the costs of the service, considering both the healthcare system perspective and the patient perspective, has been included.
Due to the main adoption of the telemedicine service for cardiac problems, the analysis on the economics dimension is specifically related to the cardiology specialty. From the healthcare system perspective, Table 2 shows how the use of 927 cardiac teleconsultations allowed to avoid 600 cardiac visits (7 visits prescribed out of 613 GP intentions) and 122 Emergency Department admissions. On the contrary, the teleconsultation service implied the prescription of 58 additional diagnostic examinations and 6 additional hospitalizations. The economic analysis specifically focuses on direct costs and savings related to in-clinic visits, diagnostic examinations and teleconsultations. From the one hand, the amount of costs is €16,834.32 for the provision of teleconsultations and €5,445.81 for the additional diagnostic examinations. From the other hand, the amount of direct savings for in-clinic visits is €20,472.00. Therefore, the provision of 927 cardiac teleconsultations required €1,808.13 in addition to the traditional practice performed without the telemedicine service, producing a substantial economic balance. However, the economic balance is not clearly the main objective. In fact, once assured the rationalization of resources, more remarkable benefits are linked to the improvement of the appropriateness of patients’ care and the management of clinical problems.

From the patient perspective, the provision of 927 teleconsultations to 812 patients at the GP’s office in the rural communities produced an amount of direct savings equal to €3,700.56. In particular, €1,000.06 are related to travels avoided for Emergency Department admissions and hospitalizations, €2,700.50 are related to travels avoided for in-clinic visits and diagnostic examinations.

Quality of written English: Acceptable
No additional revisions are required here.

Statistical review: No, the manuscript does not need to be seen by a statistician.
No additional revisions are required here.

Declaration of competing interests: I declare that I have no competing interests.
No additional revisions are required here.

Reviewer 3: Isabelle Ellis
Overall I liked the article and found it easy to read. The arguments flowed well and the conclusions drawn were logical.

1. Was the question clearly stated and well defined
   The question was not very clearly stated. It came in the last paragraph at the end of page 2. The authors did measure effectiveness and utility of the service and the level of concordance between intention and consultations which were of interest but not referred to in the aims.

2. Are the methods appropriate and well described?
   The methods were appropriate and well described for the range of things being evaluated.

3. Are the data sound?
   The data are sound being simple descriptive stats.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   The manuscript does adhere to the relevant standards. The tables are clear and well labeled

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   The discussion and conclusions have generalized a bit too readily and these conclusions are not in my opinion based on the findings. The authors have not

The aims of the study has been clearly added in Introduction section. In such a context, this paper aims at reporting the evaluation process of a teleconsultation service for General Practitioners in rural areas and describing its results. In particular, the main objectives of the comprehensive assessment are related to measure access to healthcare services for rural areas, acceptance, organizational impact and utility, effectiveness and economics of the service.

The structure of the paper has been changed in order to firstly discuss Access, Acceptance and Organizational impact dimensions for all the specialties (cardiology, dermatology, diabetology). Secondly, it discusses Effectiveness and Economics specifically about teleconsultations for cardiac problems due to the few teleconsultations for dermatological, diabetic and pulmonary problems.
been clear that the findings can really only discuss the GPs use of the cardiology service as the other types of specialist service were used by so few GPs and so infrequently. Therefore, Discussion and Conclusion are also structured in this way.

6. Are limitations of the work clearly stated? The limitations section does state an obvious limitation of the study. Other limitations have been added. Another limitation is related to the economics dimension. In fact, costs and savings related to Emergency Department admissions and hospitalizations were not included since detailed information was not systematically collected through a follow-up.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? Yes. No additional revisions are required here.

8. Do the title and abstract accurately convey what has been found? The title only really describes that an evaluation was conducted and gives no clue of the findings. The title has been modified in order to contain the main findings. Teleconsultation service to improve healthcare in rural areas: acceptance, organizational impact and appropriateness.

I recommend that the article is suitable for Publication with minor revisions. Please reconsider the title. Make the aims of the study clearer and put them in an introduction. Make the conclusions and discussion more about the cardiology service for which the authors have the data rather than the other services as these were rarely used by the GPs.

Declaration of competing interests: I declare that I have no competing interests. No additional revisions are required here.

**Associate Editor comments**

This is a paper of interest. I would add to the reviewers’ comments that there are some methodological limitations in the study which need to be addressed.

Specifically, post-event estimates of GP referral behaviour with & without specialist input are not assessed against any accepted protocol.

Whilst there are savings from changes in referral intentions, there is no description of the costs of the service.

There are no data in relation to reasons for non-participation of the almost half of the GPs originally enrolled in the study.

Another limitation of the paper is that there is little information about the demography and geography of the region. Given the importance of context to rural and remote
services, generalisation of the results to remote regions of Australia and North America, for example, needs to be cautious. 

visits, examinations, hospitalizations and Emergency Department admissions have been added. This revision also addresses the requests of reviewer 1.