"Healthcare is a people business. To be sustainable, health organizations must communicate and connect with their customers through innovative approaches and fresh perspectives..."

Top 7 Trends in Health Care, PricewaterhouseCoopers' Health Research Institute, 2007

Smartphone revolution
Computing anywhere - anytime

Telehealth revolution
Telecommunications + Healthcare = Telehealth

Contents
How I am going to waste the next 15 minutes of your life
Global Telehealth Conference 2012

Business Innovation in Telehealth
Cost-effectiveness and care coordination of CDM

In the past if you were a medical innovator, the goal was to get FDA to approve your device or chemical.

In the future, it likely will be for CMS (Center for Medicare and Medicaid Services) to approve it.

That's a major change in how we innovate.

Mike Leach, Former Secretary of U.S. Department of Health and Human Services (1980-1981)

Research Consortium
Healthcare Economics of Telehealth

Philips Electronics
Eramus University
National University

Philips Research Europe healthcare information management

Dr. Ron Koymans acts as the main stakeholder for Telehealth solutions for outpatient care.

Patrick van Deursen acts as the stakeholder from the Home Healthcare business and will provide strategies and data for the assessment of Philips’ Telehealth solutions.

Erasmus University Institute of Health Policy and Management (iBMG)

Prof. Dr. Hans Severens acts as the first promoter and the main supervisor, and brings necessary expertise in health economics, cost-effectiveness analysis and medical technology assessment.

Dr. Marc Koopmanschap acts as a daily supervisor and methodologist in the research consortium.

National University Saw Swee Hock School of Public Health

Prof. Dr. Bert Vrijhoef acts as the second promoter and supervisor and is in charge of the care coordination aspect, innovation in health and chronic disease management.

The primary aim of this research is to assess the cost-effectiveness of new Telehealth solutions that are trying to address care coordination for patients with chronic diseases.

The secondary aim is to come up with a model of assessment of Telehealth solutions, which encompasses technological, business, innovation and economic perspectives, in order to analyze beforehand the cost-effectiveness of the potentially deployable solution and its transferability to other settings or countries.

The Revolving Model
Stakeholders and Solution Integration

The Aims

The primary aim of this research is to assess the cost-effectiveness of new Telehealth solutions that are trying to address care coordination for patients with chronic diseases.

The secondary aim is to come up with a model of assessment of Telehealth solutions, which encompasses technological, business, innovation and economic perspectives, in order to analyze beforehand the cost-effectiveness of the potentially deployable solution and its transferability to other settings or countries.
Doctorate
Literature review

Conclusions:
1. First, the cost-effectiveness of telehealth in CHF does not exist.
2. Second, the quality of evidence in the scientific literature is poor.
3. Third, there is a difficulty in capturing all of the consequences/effects of telehealth intervention.

Introduction
A review of cost-effectiveness studies of telehealth interventions for CHF patients

• A proper cost-effectiveness analysis of telehealth services is scarce in the scientific literature.
• There are a handful of studies that accompany economic data in addition to clinical outcomes.
• Authors usually opt for gathering and analyzing clinical data completely oblivious to the importance of the economic data.
• Drummond et al. argue that the economic evaluation is important because: a) without systematic analysis, it is difficult to identify the relevant alternatives, b) the viewpoint assumed in the analysis is important (an intervention can be perceived important by one stakeholder and completely irrelevant by another), c) without some attempt at measurement, the uncertainty surrounding orders of magnitude can be critical.

Table 1: Distinguishing characteristics of healthcare evaluation

<table>
<thead>
<tr>
<th>Source 1: Drummond et al. (2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are both costs (inputs) and consequences (outputs) of the alternatives measured?</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<tr>
<td>Is there a comparison of two or more alternatives?</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Outcome description</td>
</tr>
<tr>
<td>Cost analysis</td>
</tr>
</tbody>
</table>

Theoretical considerations
A review of cost-effectiveness studies of telehealth interventions for CHF patients

• Systematic reviews of telehealth have been conducted with dissimilar results.
• Some trials have shown that telehealth improves clinical outcomes for chronically ill patients, mainly chronic heart failure patients.
• Some trials found that telehealth neither improves clinical nor economical aspect of chronic care.
• In current climate where we experience technological push and where a quarter of countries worldwide have a telehealth policy in place, we need more proof if telehealth is effective solution in tackling the problems of the chronic disease population, and moreover is it a cost-effective solution.
A review of cost-effectiveness studies of telehealth interventions for CHF patients

Results

• We presented a review of 32 studies reporting on cost-effectiveness of telehealth in chronic disease management of heart failure patients.

• We assessed methodological quality and bias of design of the studies.

• We performed appraisal of economic evaluation and presented the results.

• We found adequate number of eligible studies on the subject, but the interventions and outcomes in these reviews were diverse and sometimes incomparable.

• The economic aspect of telehealth was present in all of the studies, but in different forms.

• Results suggest that telehealth is cost-effective (or cost-neutral at best) for management of CHF patients: nineteen studies reported on costs savings, nine on costs being the same during and after the intervention and four on incurred costs. However, due to a great variety in studies we need to express some concerns.

The Cost-effectiveness Plane

A review of cost-effectiveness studies of telehealth interventions for CHF patients

• We tried to explore the two dimensions of interest for cost-effectiveness of telehealth: costs and effects in terms of patient outcome. Theory goes that the more effective intervention is it will be more appealing to stakeholders in charge of its implementation. If it saves costs on top of that, we call it cost-effective.

• Presented in the cost-effectiveness plane, introduced by Black, such intervention sits in the south-east quadrant and is called ‘Dominant’ (Figure 2).

• Results of our overview suggest that 19 authors, out of 32, reported on cost-effective intervention (i.e. dominant). Thus, almost 60% of retrieved studies support the hypothesis that telehealth interventions are more effective than the usual chronic disease management interventions, and save costs.
Conclusions

A review of cost-effectiveness studies of telehealth interventions for CHF patients

- Our research problem addressed the cost-effectiveness of telehealth interventions.
- Our hypothesis was that telehealth technologies applied in chronic disease management of heart failure save costs.
- We believe it is true from a societal point of view while from the perspective of healthcare delivery organizations it can be even cost incurring.
- We have tried to distill important information on economic performance of telehealth interventions from scarce economic analysis available in the literature.

Conclusions

A review of cost-effectiveness studies of telehealth interventions for CHF patients

- Economic evaluation of telehealth will present decision makers with a right set of criteria when dealing with introduction of such services.
- This review should benefit policy makers, industry, insurers, academia and patient alike as we advocate for faster adoption of telehealth services.
- We believe that piggybacking the economic analysis on top of the clinical outcomes analysis in future RCTs will save time and money.
- At this point, based on our review of cost-effectiveness studies of telehealth interventions for chronic heart failure patients, we reached three conclusions.

Conclusions

A review of cost-effectiveness studies of telehealth interventions for CHF patients

- First, the cost-effectiveness of telehealth in CHF does not exist. The evidence from the scientific literature is scarce and thus detrimental to our understanding of the economic aspect of implementing telehealth services. More full economic analyses are needed to reach a sound conclusion.
- Second, the quality of evidence in the scientific literature is poor. We sought for studies of decent methodological quality in order to attain unbiased conclusions. To our surprise we were able to retrieve only a handful of papers that could withstand rigorous methodological check.
- Third, there is a difficulty in capturing all of the consequences/effects of telehealth intervention. Thus the cost-effectiveness evidence is limited. As suggested by some authors, problems with telehealth interventions reside in absence of quality data and appropriate measures. The quality of economic data is especially questionable.

Business Innovation in Telehealth

Cost-effectiveness and care coordination of CDM

Thank you

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Home Healthcare facts and figures
Problems of today (USA)

37% Of all home healthcare expenditures are paid by Medicare

161 days Of increased hospitalizations over 10 years for undiagnosed OSA patients

$57.6B Spent on home healthcare in the U.S.

183 Seniors treated in ER each hour due to a fall

7.6M Patients receive home health services per year

5B Miles driven annually by home healthcare providers

Doctorate
The Delphi study

The Constitutional Character:
To our knowledge, this will be the first Delphi method that deals with success/failure factors of telehealth - no such attempt was undertaken before.

The Spatial Character:
The study will include approximately 30 experts from around the world, which will increase the prediction power and validity of the results.

The Temporal Character:
The study will deal with contemporary issues in telehealth but also with future ones.
We will model according to the NYHA class. It will be the Markov model with transitional probabilities compared from the literature with the ones that are an outcome of introducing a telehealth intervention.

The health effects of interest are a change of NYHA class, QoL, and survival. The medical costs of interest are hospitalizations, rehospitalizations and length of stay.

In this way we will be able to ascertain something about the cost-effectiveness of Motiva and not only on cost or effectiveness of the intervention.