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sense and simplicity

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*"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

**Business Innovation in Telehealth**  
Andrija Stamenovic, MD, MSc, MPH


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**Smartphone revolution**  
Computing anywhere - anytime






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**Telehealth revolution**  
Telecommunications + Healthcare = Telehealth



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**Contents**  
How I am going to waste the next 15 minutes of your life

		
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## 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."



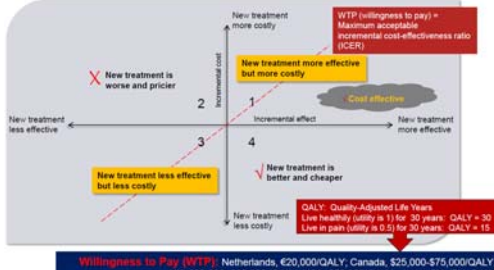
Mike Leavitt, Former Secretary of USA department of Health and Human Services (HHS), 2011

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## Payers' logic

The Cost-effectiveness Plane



WTP (willingness to pay) = Maximum acceptable incremental cost-effectiveness ratio (ICER)

QALY: Quality-Adjusted Life Years  
Live healthy (utility is 1) for 30 years: QALY = 30  
Live in pain (utility is 0.5) for 30 years: QALY = 15

Willingness to Pay (WTP): Netherlands, €20,000/QALY; Canada, \$25,000-\$75,000/QALY; UK, £20,000-£30,000/QALY; USA, \$50,000/QALY; Japan 5M JPY/QALY

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## Research Consortium

Healthcare Economics of Telehealth



**Philips Electronics**  
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 (IHMG)  
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.

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## 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.

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## Doctorate



Literature review

**Conclusions:**

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



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

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## Introduction

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

- Systematic reviews of telehealth have been conducted with dissonant 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.

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

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## 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 other), c) without some attempt at measurement, the uncertainty surrounding orders of magnitude can be critical".

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## Theoretical considerations

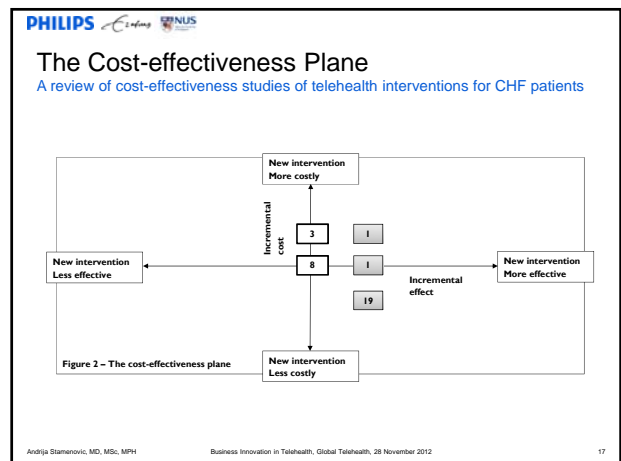
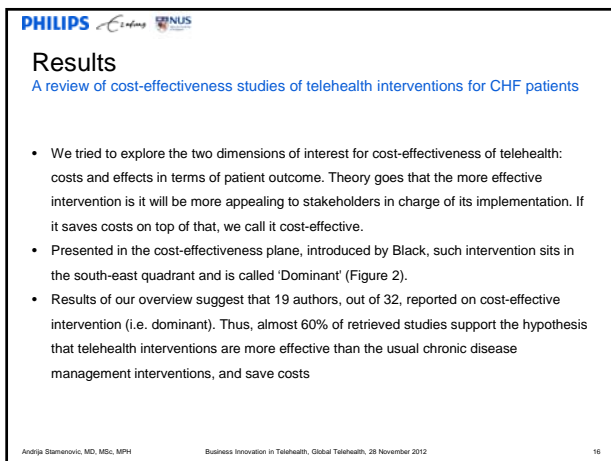
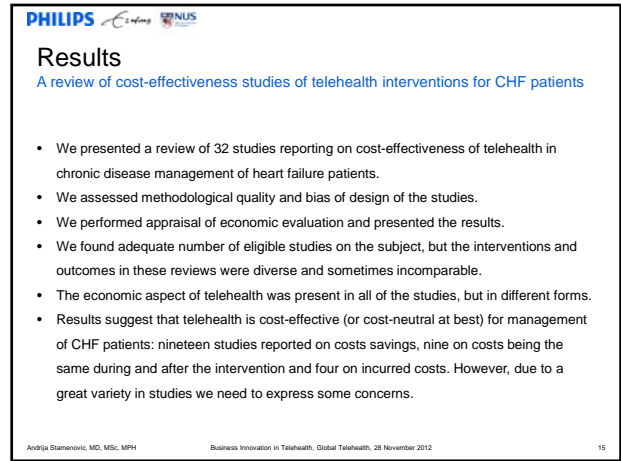
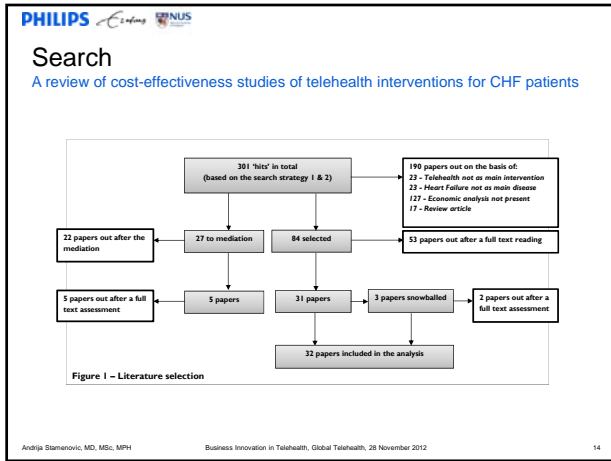
A review of cost-effectiveness studies of telehealth interventions for CHF patients


**Table 1** Distinguishing characteristics of healthcare evaluation

		Are both costs (inputs) and consequences (outputs) of the alternatives examined?		
		No		Yes
Is there a comparison of two or more alternatives?	No	Examines only consequences	Examines only costs	
		1A Partial evaluation	1B Partial evaluation	2 Partial evaluation
	Yes	Outcome description	Cost description	Cost-outcome description
		3A Partial evaluation	3B Partial evaluation	4 Full economic evaluation
		Efficacy or effectiveness evaluation	Cost analysis	Cost-effectiveness analysis Cost-utility analysis Cost-benefit analysis

Source 1: Drummond *et al.* (2005)

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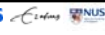
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### Conclusions

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.

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### 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.

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### 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.

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### Business Innovation in Telehealth

Cost-effectiveness and care coordination of CDM

**Thank you**  
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## Doctorate

Frankenstein model

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.

### Business Innovation in Telehealth: Cost-effectiveness and care coordination of Chronic Disease Management

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Chronic diseases are the largest cause of death and healthcare costs in the Western world and will further impact both economies as the population ages. Chronic Disease Management is a system of diagnosis and coordinated care in which both patients, the illness and pathology, are treated in a shared, flexible setting and management of long-term illnesses. Telehealth holds the most comprehensive way of dealing with chronic disease while keeping the strong advantage of healthcare professionals.



**Figure 1 - The Telehealth Ecosystem**

**Introduction**

Chronic diseases are the largest cause of death and healthcare costs in the Western world and will further impact both economies as the population ages. Chronic Disease Management is a system of diagnosis and coordinated care in which both patients, the illness and pathology, are treated in a shared, flexible setting and management of long-term illnesses. Telehealth holds the most comprehensive way of dealing with chronic disease while keeping the strong advantage of healthcare professionals.

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