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### Economic Benefits of the Boario Home Care Project

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#### eHealth

As a relatively new technological development, analysis of the economic performance of eHealth projects has been scarce and tended to receive minimal attention. Such lack of evidence of the cost benefits to be gained can, in turn, inhibit future investment in eHealth initiatives. To improve this situation, the European Commission's (EC) Information Society and Media Directorate General set up the eHealth Impact (eHI) study<sup>1</sup> in 2004. An important feature of this is the economic evaluation of ten proven eHealth sites in Europe. These evaluations apply cost benefit techniques to include monetary values of costs and benefits for all the stakeholders in each eHealth application. An eHI methodology and model have also been produced to support the evaluations.

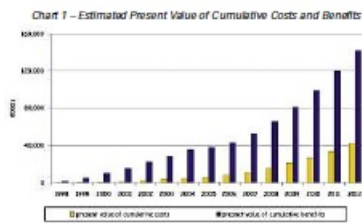
eHealth and its economic impact have been a core theme of the Association of Chartered Certified Accountants' (ACCA) health policy since 2001, when ACCA set out to work with the EC's Information Society and Media, to add to the small volume of knowledge on the impact of eHealth on citizens, patients and health services, and so support realistic and beneficial eHealth investment decisions. The fourth ACCA study<sup>2</sup> evaluated the economic impact of the Boario Home Care Project<sup>3</sup> providing telecardiology in Italy. The eHI methodology was used because it is consistent with the evaluation models used for the first ACCA eHealth Impact Report with the European Commission in 2003, and presented at the first EU Ministerial Conference on eHealth in 2005. A summary of the findings of the telecardiology evaluation is:

Table 1 - Main Findings of the Telecardiology eHI Evaluation

15 years - 1998 to 2012	%	€m	Estimated Economic Return
<b>Estimated Present Value of Benefits</b>			
<b>Citizens</b>			
Avoiding hospital inpatient admissions	25		
Avoiding hospital out patient admissions	12		
Extra, needed hospital inpatient admissions	14		
Extra, needed hospital out patient admissions	4		
Avoiding general practitioner visits	39		
Extra general practitioner visits to modify therapy	8		
Avoiding 15 days delay in therapy start or change	14		
<b>Healthcare providers</b>			
Improved use of healthcare resources	36		
<b>Total Estimated Present Value of Benefits</b>		<b>142</b>	
<b>Estimated Present Value of Costs</b>		<b>43</b>	
<b>Estimated Net Benefits</b>	<b>39</b>		<b>230%</b>

#### The Boario Home Care Project

For an eHI evaluation, the Boario Project is very valuable. Data from its clinical trials offer a robust platform for an eHI evaluation. The telecardiology service began in 1998 as a small clinical trial. The Scientific Institute of Research and Care at Fondazione Salvatore Maugeri (FSM) organised the research. As the service expanded, the Health Telematic Network (HTN) was created to deal with the increased activity generated by the new service. These two organisations have assembled the clinical and technological evidence-based platform for the telecardiology services now available throughout the Lombardy Region, and potentially throughout Italy. ACCA's eHI evaluation provides data for an eleventh eHI site, expanding the EC's eHealth Impact findings and knowledge.



Without telecardiology, patients in Italy with signs and symptoms of a heart problem, or with known cardiovascular diseases, relied on conventional health services from general practitioners (GPs) and hospitals. Access to cardiology services combined with the high number of inappropriate hospital or emergency department admissions, most with high costs, has been identified from the numerous Boario Home Care Project reports. Patients with extremely complex cardiology conditions, such as those with chronic heart disease, those waiting for heart transplants or other types of cardiac surgery, and those who need multidisciplinary caremanagement in their homes, can now use the telecardiology service, and gain health benefits. This service is essential to reduce hospital re-admissions and to improve their quality of life.

At the other end of the spectrum, some citizens experience the onset of cardiac disease, but do not have any outward, noticeable signs and symptoms. They are not yet patients, unaware of their need to access cardiology services, and so do not seek the healthcare they need at the right time. From 1998, telecardiology services began to provide access for these citizens to adequate cardiac screening services that can help to prevent cardiac conditions developing, and so change these scenarios. With this potential, the Boario

Home Care Project aimed to apply new models of disease management and new technology to cardiology services in Italy. This first phase aimed to install, evaluate, and then establish a telecardiology network for GPs in Boario, a mountain region in Lombardy. During this research stage, FSM, and later, HTN, participated in several projects with the Health Institution, Health Ministry and Health Department of Lombardy.

The second phase extended telecardiology to the Lombardy Region from 2006. From this initiative, telecardiology could potentially be made available to the rest of Italy. In the service operating from 2006, the third phase, the structure of the service centre has been expanded, with new broadband technologies, web services and an innovative teleworking model. Three different types of services are now available: one is a service to provide a rapid second opinion for GPs; the second is home telenursing for chronic patients; the third service is the call centre services for hospitals.

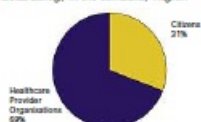
### Benefits

For citizens, patients and carers, they include:

- + Avoiding 35% of hospital inpatient admissions and 12% outpatient visits for hospital care that is unnecessary.
- + Securing hospital admission for 14% of patients, and 4% of outpatients who need hospital care, but were not identified by conventional cardiology services.
- + Avoiding 99% of cardiology-related visits to general practitioners.
- + Avoiding 15 days wait for the beginning or modification of therapy for 14% of patients;
- + Reducing travel time and costs for patients and carers.
- + Reducing anxiety for patients and carers.
- + Improving quality of life for patients, families and carers.

Benefits for GPs and hospitals include fewer avoidable hospital admissions and visits for patients who do not need these services. This reduction releases capacity that can be used for other patients, especially those citizens identified by the FSM research as in need of hospital services, but who were not receiving them.

Chart 2 – Distribution of Benefits of Telecardiology in the Lombardy Region



These improvements in resource utilisation also enable quality to be improved. By deriving service standards and protocols directly from the clinical research in the Boario Home Care Project, and recording the data and conversations of every telecardiology transaction, HTN monitors

and reviews its performance and clinical protocols promptly, regularly and routinely. This ensures that the performance of its network of cardiologists, other healthcare professionals and call centre staff complies consistently with the required, evidence-based protocols, and so enables the HTN to maintain high quality standards.

#### **eHI Economic Evaluation**

Over the 15-year lifecycle of the eHealth investment in telecardiology, an estimated economic return of some 230% will be achieved. The return is the present value of the net benefit as a percentage of the present value of costs. The cumulative estimates of costs and benefits are shown in Chart 1. The economic impact of extending telecardiology across the whole Lombardy region, steadily over about six years up to 2012, is material. Much of the investment needed in information and communication technology, ECG equipment and service infrastructure has already been set in place by HTN. The total net benefits are considerable, with an estimated annual benefit cost ratio of more than 3.3:1 by 2012.

The correlation of annual utilisation changes and annual cost changes is weaker, at more than

+0.5. It shows the need to manage costs directly, and not rely on utilisation to contain costs. It also shows the need for direct cost control to ensure that costs do not drift and so erode the net benefits.

Benefits of telecardiology have been grouped into citizens and healthcare provider organisations. About 31% are direct for citizens; about 69% are for healthcare provider organisations, as shown in Chart 2.

All the values used in the eHI evaluation are tested for sensitivity.

+All costs have been increased by 50%, all benefits reduced by 50%, and

+the discount rate has been increased, and decreased by 50%. The economic return is not diminished by the sensitivity analysis, confirming that telecardiology can offer an effective eHealth investment, with benefits both for citizens and healthcare providers.

The research sets out a roadmap for policy-makers, based on sound clinical evidence and is an excellent example of clinicians and finance professionals working together to maximise health benefits. Crucially, the significant care improvements identified by the research are relevant to health systems throughout the EU Member States and beyond.

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