

SYSTEMS REFERENCE DELIVERABLE

**Economic evaluation of active assisted living services –
Part 1: Framework**

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IEC SRD 63234-1:2020

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ECONOMIC EVALUATION OF ACTIVE ASSISTED LIVING SERVICES –

Part 1: Framework

FOREWORD

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IEC SRD 63234-1, which is a Systems Reference Deliverable, has been prepared by IEC systems committee Active Assisted Living.

The text of this Systems Reference Deliverable is based on the following documents:

Draft SRD	Report on voting
SyCAAL/153/DTS	SyCAAL/165/RVDTS

Full information on the voting for the approval of this Systems Reference Deliverable can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC SRD 63234 series, published under the general title *Economic evaluation of active assisted living services*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

Under the "Triple Aim" [1]¹ concept (now "Quadruple Aim" [2]), a well defined, inclusive set of objectives for new interventions, leading to improvements in the local and national healthcare systems, consists of the following:

- improve the health of the population;
- improve the patients' (e.g. AAL care recipients) experience of care;
- lower (or hold constant) the per capita cost of care to the healthcare system to ensure sustainability; and
- (the recently added fourth aim) improve the work life of healthcare providers (e.g. healthcare professionals and AAL formal carers), clinicians, and other staff.

Economic evaluations of proposed new healthcare services and technologies involve the assessment of the costs and effects of any interventions in the healthcare system and provide input into the economic sustainability objective above. Where there are important health outcomes that can be evaluated in monetary terms, a cost-benefit analysis can be undertaken as a 'non-reference case analysis' (Alternate Scenario analysis) with details provided on the derivation of the monetary value of the health outcomes. Appropriate economic evaluations will provide evidence to address the financial considerations of proposed new interventions along with the impact on health outcomes.

To achieve the Quadruple Aim objectives, all new technology-supported homecare or Active Assisted Living (AAL) services (such as remote monitoring of patient physiological measurements, in-home medication adherence monitoring and management, as well as mobility aids and emergency reporting services) should be evaluated to ensure they not only improve the quality of the patients' lives but also provide economic benefits greater than the cost of providing the service. Without financial benefits that exceed the cost of the service to the health system funder, or at the very least an economically neutral situation while improving patient outcomes over usual care pathways, the services will not be sustainable – or the healthcare services funder must be prepared to knowingly increase its cost per patient supported by the system to achieve the population health outcomes.

Furthermore, health system funders may be presented with a choice of options for investment in new or expanded services. In order to compare options from a financial costs and benefits perspective (as well as their health outcomes), economic evaluations of the options will provide an equal basis for comparison of the options.

¹ Numbers in square brackets refer to the Bibliography.

ECONOMIC EVALUATION OF ACTIVE ASSISTED LIVING SERVICES –

Part 1: Framework

1 Scope

This part of IEC SRD 63234 provides a descriptive framework and template for the economic evaluation of the implementation of technology-supported home healthcare or wellness services, or AAL services that support communications, transportation, etc. as defined in a series of AAL use cases. The financial analysis is completed from the point of view of the healthcare services funder, aged care services funder, or similar governmental or non-governmental organization (e.g. the government in a state-sponsored system or possibly a health management/health insurance company in a privately funded system, a private or governmental organization financing delivery of home support or specialized transportation services).

This document is structured to provide a means of capturing data for a Reference Scenario (typically the current means of providing care, often known as 'usual care', to the target patient population) to compare against an Alternate Scenario (the service or technology intervention) for an economic comparison. Standard economic measures can be estimated (using an electronic spreadsheet or other analysis tool) such as Return on Investment (ROI), Net Present Value (NPV), and Payback Period of the investment.

This document is applicable to all potential AAL services and AAL systems that may be developed or the development and manufacture of any of the underlying components (whether hardware or software).

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2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

AAL service

action or function of an AAL system creating an added value for customers

EXAMPLE 1 Configuration and maintenance of AAL systems.

EXAMPLE 2 Assistant systems to support the home environment.

[SOURCE: IEC 60050-871:2018, 871-01-04]

3.1.2

AAL user

person who uses or benefits from, or uses and benefits from, AAL devices, systems or services

[SOURCE: IEC 60050-871:2018, 871-02-05]

3.1.3

AAL care recipient

person who receives and consumes AAL care services

3.1.4

AAL informal carer

person who provides informal (or lay) services to the AAL care recipient

3.1.5

AAL formal carer

person who provides personal or homemaking services to the AAL care recipient

3.1.6

AAL system

for <AAL services> set of interrelated elements as a whole and separated from the environment

Note 1 to entry: A system is generally defined with the view of achieving a given objective, e.g. by performing a definite function.

Note 2 to entry: Elements of a system can be natural or man-made material objects, as well as modes of thinking and the results thereof (e.g. forms of organization, mathematical methods, programming languages).

Note 3 to entry: The system is considered to be separated from the environment and the other external systems by an imaginary surface, which cuts the links between them and the system.

Note 4 to entry: The term "system" should be qualified when it is not clear from the context to what it refers, e.g. control system, colorimetric system, system of units, transmission system.

[SOURCE: IEC 60050-151:2001, 151-11-27, modified – The domain "<AAL services>" has been added. In the definition, "in a defined context" has been deleted.]

3.1.7

remote monitoring

condition monitoring and monitoring of persons from a distance by using telecommunication

[SOURCE: IEC 60050-871:2018, 871-04-27]

3.2 Abbreviated terms

AAL Active Assisted Living

NPV Net Present Value

ROI Return On Investment

CSF critical success factors

4 General

4.1 Document objective

This document provides a framework and template for the economic evaluation of the implementation of technology-supported home healthcare, wellness or AAL services. This analysis is completed from the point of view of the healthcare system or services funder (for example, the government in a state-sponsored system or possibly a health management/health insurance company or Accountable Care Organization in a privately funded healthcare system).

4.2 Economic evaluation process overview

4.2.1 Alternate versus Reference Scenario

The economic evaluation process proposed is a comparison of a Reference Scenario against an Alternate Scenario, the AAL service or technology intervention, using a cashflow analysis over an appropriate time period.

The Reference Scenario (also commonly referred to as a "base case" or "base scenario") is typically the current means of providing healthcare or health services, often known as "usual care", to the target patient population. This can be for a specific disease or more general care as provided by the healthcare funder prior to the AAL service or technology being considered.

The Alternate Scenario describes AAL service or technology, the specific intervention or benefits it hopes to achieve, and outlines the impacts on the delivery of healthcare. In an economic evaluation context, these impacts would typically be financial cost savings to some part(s) of the healthcare system.

In some interventions under consideration, the focus of benefits can be almost entirely on population health outcomes (for example, improved quality of life for the AAL care recipient) with limited or no financial benefits. In this situation, the expected health outcomes should be validated and the objective of the analysis becomes largely determining the net cost to the healthcare system of achieving these outcomes.

4.2.2 Time period for analysis

While a five-year time period of analysis is very common, an appropriate time period should be determined based on specific aspects of the proposed intervention. For example, if components of the equipment (hardware, software, etc.) require a significant investment and have an expected seven-year lifecycle, then it may be more appropriate to complete a cashflow analysis for the seven-year period.

4.2.3 The cost of money

This cashflow analysis should also include the "cost of money" or time value of money to the organization proposing the new service. This cost of money could be interest rate on a loan by the organization required to invest in the intervention or setting up the AAL service. A stricter definition would be the opportunity cost (forgone income) of the money invested in government bonds.

4.2.4 The economic or financial indicators

The proponent of the intervention or introduction of the service will gather the appropriate cost details of the two (or more) scenarios and calculate standard financial measures (using an electronic spreadsheet or other analysis tool). These measures should include, as a minimum:

- Return On Investment (ROI) – the gain or loss generated by an investment relative to the amount of money invested (typically expressed as a percentage);
- Net Present Value (NPV) – the difference between the discounted future cash flows from an investment and the original investment amount;
- Payback period – the length of time to recoup the initial investment in a project, product development or service implementation.

A sustainable AAL service or intervention will have a positive ROI and NPV. The Payback Period will vary based on the size of the initial investment required to implement the service and the rate of economic benefits realized.

4.2.5 Multiple Alternate Scenarios

Comparing multiple Alternate Scenarios is common. If multiple Alternate Scenarios are being evaluated or contemplated, they should each be compared to the Reference Scenario, the same economic indicators determined, and the different Alternate Scenarios compared to each other on an economic sustainability basis using the financial indicators described above.

4.2.6 Risks and critical success factors

The term "estimated" is used intentionally above. While it is assumed that the evaluator will use evidence-based inputs in the economic model to the greatest extent possible, as a forward-looking model there will always be an amount of uncertainty in future outcomes. Similarly, critical success factors (CSFs) in the implementation of the service should be identified at the outset.

For identified areas of uncertainty and critical success factors, the user of this template should also:

- a) identify which inputs are the most sensitive in determining economic results and either try to reduce the margin of uncertainty in the values used in the calculation; or
- b) conduct a sensitivity analysis by trying a range of potential values for these factors to determine if the level or risk is too high to continue to implement the intervention (for example, a positive, sustainable project could turn into a costly unsustainable service).

If a decision is made by the healthcare funder to implement a new service and/or underlying technology, then special attention should be paid to the identified critical success factors during the implementation stages of the project.

4.3 Document structure and how to use the framework

[IEC SRD 63234-1:2020](#)

This document provides a descriptive framework and a set of templates. It is structured as a step-by-step means of completing the evaluation process outlined above and coming to a set of conclusions and recommendations about the proposed intervention. Users should complete the set of blank templates contained in Annex A while progressing through the descriptive aspect of the framework in the main body of this document.

Clause 5 presents a format for a summary overview or abstract (sometimes known as an Executive Summary) of the AAL service, its analysis and recommendations.

Clause 6 recommends a format for providing a descriptive overview of the AAL service or intervention.

Clause 7 describes a template for gathering the information required to complete the economic evaluation, for both the Reference Scenario and the Alternate Scenario(s).

Clause 8 provides a means for calculating the economic and financial indicators.

Clause 9 describes critical success factors in more detail and proposes a set of considerations.

Lastly, Clause 10 suggests a format for developing final considerations and recommendations which would be made as a result of the economic evaluation.

Annex A contains a set of empty templates for the user to complete an analysis.