

Medical equipment asset management framework

Medical equipment business case package

September 2007

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About this document

1 Introduction

The following document represents the first draft of the business case package and should be considered a working document. It is intended that examples and case studies will be developed as part of the future development of the business case package. Future iterations of this package may include investigating the development of different versions of the business case template to cater for the different values of equipment to be acquired, that is, low cost, high cost, very high cost.

This package is structured into the following three components:

1. Section A: Business case guidelines
2. Section B: Full life cycle costing
3. Section C: Business case template

The purpose of this document is to provide templates and associated guidelines that can be utilised to assist health services develop business cases to acquire new and replacement medical equipment.

These guidelines are an element of the Medical equipment asset management framework (MEAMF), which aims to provide an improved management platform to support health services meet their healthcare delivery objectives effectively while sustaining Victoria's public hospital medical equipment asset base.

The template has been developed to assist health services in preparing a business case to acquire medical equipment. It is only intended to be a guide to the extent and type of information that should be presented in developing a business case. Health services may find it necessary to amend or augment the template with additional information where necessary to support the business case.

2 Purpose of business case

A business case is a management tool that supports planning and decision making. It should succinctly provide all relevant detail to enable the reader to make an informed decision regarding the justification for seeking funding to acquire the requested medical equipment item or system, or future planning for replacement.

A medical equipment item or system business case should explain:

- what the medical equipment item or system is
- why the medical equipment item or system should be acquired
- what outcome(s) will be achieved such as improved throughput, reduced OH&S risk
- what other options have been considered
- how much the medical equipment or system will cost over its effective life
- what the risks are and how these will be managed
- what the state of readiness to implement the recommended option
- what the total amount of funding required is and the intended funding source.

3 When is a business case required?

It is intended that the completed business case templates will be used for submissions to the department either:

- when requesting capital funding for additional (versus replacement) equipment with a value in excess of \$100,000
- when seeking permission for leasing¹ medical equipment
- when requesting capital funding for replacement equipment (individual items, aggregates or systems) with a value in excess of \$600,000
- as requested by the department.

1. Applies to both finance and operating leases. The approval requirements for finance leases are outlined in the *Borrowing guidelines for public hospitals and community health centres* (www.health.vic.gov.au/borrowing/index.htm). The policy framework for entering into operating leases is set out in the *Prudential risk management framework for the State's financial markets activities* (Department of Treasury and Finance, March 2001). In section 6.2.6, the *Prudential risk management framework* states, "While there are no restrictions on operating leases, a financial evaluation must be performed on all operating leases greater than 12 months and for capital value worth more than one million dollars, to assess the cost of the proposal (refer Appendix 1 [of the *Prudential risk management framework*])".

4 Acknowledgements

The following documents were reviewed in developing this business case template:

- Department of Human Services, *Targeted Equipment Program 2005-06*, equipment submission form
- Department of Human Services, *Business case template*, Version 0.1, 22 July 2004
- Department of Treasury and Finance (DTF), Gateway Initiative, *Business case development guidelines*, revised April 2005
- DTF, *Investment evaluation policy and guidelines*, September 1996
- Department of Health (Western Australia), *Business case guidelines*, October 2006
- statements of priorities (various health services).

In addition, the MEAMF project would like to acknowledge the valuable input and feedback received in developing the business case package from the following:

- staff at the department and various health services
- MEAMF Asset Management Working Group
- MEAMF Finance Working Group
- MEAMF Project Team
- MEAMF Steering Committee.

Section A: Business case guidelines

5 Executive summary

The executive summary should be drafted such that it can be used as a stand-alone companion document to the full business case document. It should cover all the key issues that a decision maker will need to know about the proposed acquisition.

The executive summary should enable the reader to quickly gain an understanding of the:

- proposed acquisition
- options and alternatives considered
- analysis undertaken
- details of the preferred option
- implementation approach
- known key risks.

Although the executive summary is at the beginning of the business case it is often the last section drafted.

The executive summary should provide a succinct summary of the following key points:

- how the equipment or system will meet the identified service need
- alignment of the acquisition to the service objectives of the health service, as well as Department of Human Services and whole-of-government strategic directions
- the options considered for meeting the service need
- the short-listed options and the basis for the short listing
- rationale for the preferred option based on fitness for purpose, costs, benefits and risks
- readiness to implement and timeframes for implementation
- the life cycle costs associated with the preferred option
- the budgetary implications for the acquisition – both capital and recurrent – and how it will be funded
- planning for implementation including project management and governance, procurement strategy, post implementation assessment and project risk management.

As a guide the executive summary should be limited to one page for small, low-value medical equipment acquisitions, up to a maximum of four pages for larger value more complex proposals.

6 Description of medical equipment needs

Asset planning is fundamental to the effective management of an organisation's business. Matching the medical equipment requirements of health services to their service delivery strategy should result in medical equipment assets consistent with the scope, capacity and performance of the service required.

Planning and identifying needs is the starting point for asset management. This involves a thorough examination of why the particular equipment is required and must give consideration to the full range of options for responding to it. These options may include both asset- and non-asset-based solutions as well as demand management strategies. For example, a health service may have multiple ultrasound units in the health service, hospital or department, the needs analysis should clearly identify why a replacement or additional ultrasound may be required.

It is acknowledged that the decision-making process on equipment needs may occur in isolation to any funding opportunities or calls for funding submissions. The process of asset planning and identification of equipment needs enables the development of priority equipment needs. These priorities should be regularly reviewed and may need to be updated to reflect, for example, impacts from changes in technology, service delivery methods or the cost of equipment.

The purpose of this section of the business case is to clearly identify the strategic context for the proposed purchase and its linkage to the health service's strategic plans, departmental and whole-of-government priorities.

6.1 Introduction and background

This section provides a brief summary of the medical equipment acquisition proposal. It provides any additional information on the proposal that may not be included in other sections of the business case.

This section may also be used to provide more detail on complex or high-value proposals, or those that have a longer or staged development history.

6.2 Strategic context

This section describes the strategic context in which the health service operates. Reference should be made, where appropriate, to the following:

- medical equipment asset management plans for the department and health services
- health services strategic plans
- statements of priorities
- service plans
- regulatory and legislative compliance requirements such as the Radiation Safety Act.

The above is not expected to be an exhaustive list, but merely a guide to the nature and type of documents to be referred to.

This section clearly articulates the link to the relevant documents and how the proposed acquisition aligns with the strategic directions for service delivery and how the proposal contributes to the achievement of these policy directions, frameworks, and strategies. **It is not necessary to re-state the relevant policy and strategy documents, but reference the section or recommendation relevant to the proposal.**

The strategic linkages and alignments are best presented in tabular form and the following table should be completed in preparing the business case.

The alignment of the proposed acquisition with the strategic directions of the government, department and health service is demonstrated by examples similar to those included below:

Policy statement/strategic objective	Degree of alignment (High/medium/low)	Evidence supporting degree of alignment
<i>Example:</i> Provide efficient and effective services based on evidence and need	High	Demand for services has increased by X% during the past two years. The purchase of this equipment will provide sufficient capacity to meet current and known projected future demand for the next Y years.
<i>Example:</i> Achieve a financially sustainable organisation	High	The purchase of the replacement equipment will reduce ongoing maintenance and consumables costs by Y% per annum or savings of \$Z per annum.

Where possible, the supporting evidence presented in the above table should be based on actual figures rather than estimates.

6.3 Service profile

This section of the business case provides the decision-maker with background information on the current service and equipment, current and future demands on the service or department and any changes to the nature, type and amount of equipment that may be required to meet those future demands.

6.3.1 Current service profile

This section outlines the current operating environment of the specific service area/department relevant to the proposed equipment acquisition. It should include information on activity levels, demand, utilisation, patient profile, types of procedures, waiting time to access the equipment, and the relative importance of the service area/department to the health service and the delivery of health services more broadly.

The following information, where relevant, should be included in the current service profile:

- types of services/procedures provided
- number of services/procedures provided
- service capacity
- waiting times for procedures

- patient profile and mix (public, private)
- service demand, utilisation, burden of disease
- condition, use and effectiveness of equipment (capacity to sustain service delivery)
- relationships with other service providers and models of care.

6.3.2 Future service profile

This section identifies how the service profile of the specific service area/department is expected to change and the range of factors that will impact on the demand for and provision of these services over the next one to five years. These factors may include:

- impacts of whole-of-government, health service or Department of Human Services policies and strategies
- changes in the profile of the number, type and mix of patients
- plans of other health service providers
- Commonwealth, State and local government policy
- changes in legislation, regulations, standards and accreditation requirements
- changes in medical technology and practice.

A description of the future needs and demands for the specific service area/department and the projected future levels of service provision should be provided. These future needs should be based on a short- to medium-term horizon (one to five years). As a guide, the following information, where relevant, should be presented:

- projected impact of policies and strategies on the delivery of health services and models of care
- projected service demand and utilisation trends
- estimated service/procedure capacity requirements
- types of services/procedures to be provided
- projected activity levels by service type/procedure
- workforce requirements.

The assumptions underlying each projection must be explicitly stated.

6.3.3 Identified service need

The previous two sections (Current service profile and Future service profile) of the business case outline the current and expected future service profile. This analysis will demonstrate the gap between the current level of service provided and what is required in the future.

The purpose of this section – Identified service need – is to outline how these identified gaps can be overcome through the proposed equipment acquisition.

The table below includes examples of indicators that could be used to demonstrate how the service profile will change. **It is important that the indicators chosen can be reliably and readily measured and are of relevance to the proposed equipment acquisition.**

Service profile indicators	Current	KPI/evidence to support current profile	Future	KPI/evidence to support future profile
Patient profile				
Public/private prioritisation				
Compensable patients				
Revenue generation capacity				
Range of services/ procedures provided				
Demand for the service/ procedure(s)				
Number of procedures performed by the medical equipment being acquired				
Waiting period for procedure				
Frequency of accreditation/ certification requirements for the equipment being acquired				
Workforce requirements (number and type) relevant to the equipment acquisition				

In addition to anticipated changes to the future delivery of health services, the equipment needs should also be based on an understanding of the level and condition of the existing medical equipment.

A review of the existing equipment will assist in determining whether the performance of these assets is adequate to support the service delivery strategy or if the equipment is no longer required, or superseded by changes in technology or changes in clinical practice. The *Medical equipment prioritisation and self-assessment package* has been developed as part of the MEAMF to assist health services in reviewing and identifying the medical equipment replacement requirements.

In evaluating and reviewing equipment performance, the following provides examples of some of the aspects that need to be assessed:

- *Condition* – Is the equipment adequately maintained? Is there a maintenance backlog? Are major replacements or refurbishments likely to be required in the short term (one to five years)?
- *Utilisation* – How often and how intensively is the asset used? What is the actual usage compared to throughput capacity? What are the waiting times to use the equipment? What is the level of ‘down time’ for the equipment compared with the manufacturer’s benchmarks?
- *Critical risk assessment* – Does the equipment currently pose any serious risks such as OH&S, patient safety, service availability? How would a delay in acquisition of the replacement equipment affect critical risk factors? How dependent is the health service on this item of medical equipment for service delivery? What are the possible flow-on implications if the equipment is not available?
- *Functionality/clinical efficacy* – How well suited is the equipment to the services it supports? What is the evidence-based efficacy of the procedures that are proposed to be undertaken? Which procedures are research related and how will they be funded?
- *Costs* – Are the equipment’s operating costs higher/lower than for those of comparable equipment? Are the energy, maintenance, and repair costs reasonable?
- *Age/effective life* – Is the current asset reaching the end of its effective life? What future service potential could be obtained from the equipment?
- *Disposal* – what opportunities are there for the disposal or re-allocation of the equipment?
- *Importance or criticality of the medical equipment to the health service.*

It is expected that this analysis would be facilitated by data captured in the services asset register and asset management systems.

7 Option evaluation

This section of the business case should clearly outline the process used to develop and evaluate options to address the identified equipment need and document the outcome of the evaluation. The business case describes the process followed in generating, assessing and comparing the options and why the preferred option was chosen.

7.1 Summary of options

This section provides a summary list of the short-listed options and a brief description of each option.

7.2 Options development

Once the equipment need has been identified and articulated, the next step in the business case process is to consider a wide range of options for meeting the identified need. The range of options to be considered should also include non-asset solutions.

Possible options for consideration include:

- *non-replacement* – maintain the existing equipment item
- *replacement* – ‘like-for-like’ replacement of the existing equipment, noting that technological advances may have resulted in the replacement item being significantly different to the item being replaced
- *refurbishment/upgrade* – undertake upgrade works to the existing medical equipment item
- *consolidation/reconfiguration of existing equipment* – improve the utilisation rate of similar types of equipment to avoid the replacement or purchase of additional equipment
- *alternate service delivery* – investigate how the service could be delivered without investment in the new/replacement item of equipment such as alternate campus, external service provider.

In developing the options for analysis, consideration should also be given to the possible funding options. These would include considering outright capital purchase, operating leases, outsourcing and ‘bundling’ the equipment acquisition with a consumables contract.

It is expected that the ‘do nothing’ option of maintaining the current service delivery arrangements will always be included as one of the options to be considered. This is included to provide a base case for the comparison of the costs and benefits of the alternative options.

7.3 Process for option development

This section briefly explains the process for identifying the possible options for meeting the identified equipment need.

Depending on the number and extent of options identified, criteria used for the short listing of options should be documented in this part of the business case. It may be necessary to short list the options for full analysis with the remaining options summarised in an appendix.

7.4 Option analysis

An analysis of the benefits and costs of each of the short-listed options needs to be undertaken to identify the preferred option for meeting the service need. The analysis needs to cover both financial and qualitative considerations in order to determine the option that best meets the service need from an overall 'value-for-money' perspective.

7.4.1 Qualitative analysis

The qualitative analysis involves an assessment of the non-financial aspects of each short-listed option. This section of the business case documents the non-financial aspects of each option and assesses them against a set of evaluation criteria. The evaluation criteria could include, but is not limited to the following:

- quality of healthcare (shorter stays, faster recovery, less invasive procedure)
- safety (for staff and patients)
- utilisation (access to equipment, waiting times, throughput)
- fitness for purpose (alignment to service delivery strategy)
- integration/interfacing (how well the chosen option can be integrated with other systems and equipment, that is, IT and infrastructure already installed in the health service)
- change management impact (training, industrial relations)
- readiness to implement
- interdependencies and linkages to other projects.

The above criteria is not intended to be an exhaustive list, however is provided as a useful set of criteria for evaluating and analysing each short-listed option. Consultation with key stakeholders can assist in developing additional criteria for the evaluation of short-listed options.

It is suggested that in evaluating the satisfaction of each criteria a scoring range of -4 to +4 be adopted, in accordance with the Department of Treasury and Finance's (DTF's) *Investment evaluation policy and guidelines* and as outlined in the table below.

Ratings	Value
Very much better than the base case	+4
Much better than the base case	+3
Moderately better than the base case	+2
Little better than the base case	+1
Same as base case	0
Little worse than the base case	-1
Moderately worse than the base case	-2
Much worse than the base case	-3
Very much worse than the base case	-4

To enable the comparison of each option, it is recommended that the benefit evaluation is presented in a tabular form as follows:

Evaluation criteria	Base case ('do nothing' option)	Option 1	Option 2	Option 3
<i>Example:</i> Waiting time for procedures	0	-1	+2	+4
<i>Example:</i> Training requirements	0	0	-2	-1
<i>Example:</i> Readiness to implement	0	0	+1	+1
Total score	0	-1	+1	+4
Average score	0	-0.33	+0.33	+1.33

Please note that the above table assumes that each evaluation criteria has equal weighting; however, there is no requirement to apply equal weightings to each evaluation criteria.

7.4.2 Financial analysis

The aim of the financial analysis is to identify the total life cycle cost of each short-listed option to enable comparison and selection of the best 'value-for-money' option.

A full life cycle cost analysis of the 'do nothing' option should be included as the base case. This will provide the baseline cost position and will identify which options include significant changes in costs and will assist in identifying the funding strategy required.

The financial evaluation of each option should be conducted using the *Life cycle costing template*, which is included as Section B of this document. The template includes instructions on how to use the template and provides guidance on the costs to include in the analysis over the expected life of the project. The reason for the chosen term (such as five years, seven years or ten years) and any other key assumptions should be documented.

A summary table of the life cycle cost analysis should be included in this section as follows:

Life cycle costs	Base case ('do nothing' option)	Option 1	Option 2	Option 3
Revenues	(\$300,000)	(\$330,000)	(\$320,000)	(\$300,000)
Residual value	(\$5,000)	(\$10,000)	(\$8,000)	\$0
Total revenue	(\$305,000)	(\$340,000)	(\$328,000)	(\$300,000)
Acquisition costs	\$0	\$250,000	\$200,000	\$0
Leasing costs	\$0	\$0	\$0	\$270,000
Maintenance costs	\$300,000	\$100,000	\$100,000	\$75,000
Repair costs	\$65,000	\$50,000	\$50,000	\$45,000
Operating costs	\$75,000	\$35,000	\$40,000	\$65,000
Disposal costs	\$10,000	\$7,500	\$7,500	\$2,500
Total costs	\$450,000	\$442,500	\$397,500	\$457,500
Total net life cycle costs (net present cost)	\$145,000	\$102,500	\$69,500	\$157,500
Score	0	+2	+4	-4

Please note the above amounts are hypothetical examples and are included for illustrative purposes only.

The financial analysis should be scored using the following rating system.

Ratings	Value
Least expensive compared to the base case	+4
Significantly less expensive than the base case	+3
Moderately less expensive than the base case	+2
Less expensive than the base case	+1
Same as base case	0
More expensive than the base case	-1
Moderately more expensive than the base case	-2
Significantly more expensive than the base case	-3
Most expensive compared to the base case	-4

The detailed life cycle cost analysis should be included as an attachment to the business case.

7.4.3 Overall analysis

This section summarises the qualitative and financial analysis and provides commentary on the overall scores of the various options.

Evaluation criteria	Base case ('do nothing' option)	Option 1	Option 2	Option 3
Qualitative analysis	0	-0.33	+0.33	+1.33
Weighted qualitative analysis score (70%)	0	-0.23	+0.23	+0.93
Financial analysis	0	+2	+4	-4
Weighted financial analysis score (30%)	0	+0.60	+1.20	-1.20
Combined weighted score	0	+0.37	+1.43	-0.27

The above example assumes that the qualitative criteria has a weighting of 70 per cent and the financial criteria has a weighting of 30 per cent for determining the overall score for each option; however, different weightings may be applied in determining the combined weighted score.

The relative importance of financial impacts and qualitative criteria will depend on the strategic importance of the medical equipment and the overall investment objectives for service delivery and financial performance. **In the context of the overall options evaluation of medical equipment acquisitions, qualitative criteria will generally be given a higher weighting than financial performance.**

Determining the relative weighting of financial impacts to qualitative criteria should be influenced by the service delivery objectives (such as health service strategic plans) and the financial performance outcomes expected from the investment in the medical equipment. The following table, based on DTF's *Investment evaluation policy and guidelines*, sets out some possible weightings based on different investment objectives.

Investment type	Non-revenue generating	Revenue-generating	Commercial
Investment objective	Service delivery	Service delivery with some financial returns to offset operating costs	Service delivery and a commercial return
Qualitative analysis weighting	60% - 75%	50%	40% - 25%
Financial analysis weighting	40% - 25%	50%	60% - 75%

7.5 Preferred option

The preferred option is determined by comparing the benefits derived by a specific option with its life cycle cost (net present cost terms) from the overall option analysis.

The business case documents the preferred option and the reasons in terms of its cost and benefits. The rationale for the chosen option should be clearly stated and supported by the outcomes of the analysis. For example, reasons for selecting the chosen option could include:

- improved treatment outcomes
- meets current demand and known and future emerging growth
- enables increased efficiency and throughput
- reduces waiting times and costs resulting from down time and maintenance of faulty or less than efficient equipment.

In addition, how the preferred option aligns with the service objectives of the health service, Department of Human Services and whole-of-government strategic directions is outlined briefly here.

Stakeholder support for the preferred option should be described in the business case. It should include details on which particular stakeholders have been consulted (such as area/department, title/role) and how these stakeholders have been involved in the development of the business case.

8 Implementing the preferred option

This section of the business case outlines the intended approach to implementing the preferred option.

The project management arrangements and implementation plan have already been outlined in the business case. While it is not expected that all elements of the implementation plan will have been determined or developed in detail at this stage, the business case should outline the crucial elements of the implementation plan and how these will be addressed.

The following sections outline the type of information on the preferred option, and the project management and implementation that should be included in the business case.

8.1 Project management and implementation

The project management arrangements and plan for implementation of the preferred option are to be documented in the business case.

In most instances plans and strategies are unlikely to be fully developed at the time of preparing the business case. However, it is important that the business case demonstrates that the various issues and risks factors associated with the successful implementation of a project have been considered and strategies addressing these issues and risks are being developed.

8.1.1 Project management and governance

This section of the business case provides an outline of the project management and governance arrangements that have been implemented, or are in the process of being implemented, to manage the implementation of the proposed equipment acquisition.

Where possible, existing governance structures such as an equipment/infrastructure management committee should be utilised to manage the implementation of the proposed equipment purchase. However, for high-cost and complex equipment purchases it may be appropriate to establish a specific project team.

The business case should include details of the proposed governance structure for the proposed medical equipment acquisition regardless of whether an existing governance structure will be used or not.

The business case outlines the terms of reference and composition of the following:

- project sponsor such as chief executive or executive director
- steering committee
- project team
- working groups.

8.1.2 Project risk management

Risk management is an important part of the implementation plan for the preferred option.

The plan should have identified the key risks associated with the preferred option and described the strategy that will be implemented to mitigate the impact of these risks.

The implementation plan identifies who will be responsible for implementing the risk management mitigation strategies and monitoring their impact.

The costs of specific risk-management strategies, where quantifiable, should be identified and incorporated into the financial analysis of the preferred option.

All risks and mitigation strategies are to be recorded in a risk register and regularly reviewed.

A suggested format is as follows:

Risk description	Likelihood of occurrence	Consequence	Mitigation strategy
<i>Example:</i> Delay in equipment arriving from overseas	Low	Medium	Extend temporary service arrangements on alternative campus.

8.1.3 Transition planning

The acquisition of a new or replacement item of equipment may require a period of temporary changes to service delivery to enable the equipment to be installed, tested and commissioned.

Health services should develop a transition plan that enables the continuation of service delivery while the new or replacement equipment is brought into service. This transition plan also provides a basis for identifying risk-management strategies to maintain clinical safety, but also contingency measures if there are delays in implementing the equipment.

The transition plan should describe:

- the transition actions relating to the medical equipment acquisition, how they will be achieved and by when
- the responsibility and accountability for the transition actions
- how the transition will be monitored
- what other interdependent actions need to occur to achieve successful transition
- input from stakeholders in the transition process, including identifying and communicating transition actions.

8.1.4 Procurement

The business case outlines the procurement method (such as quotations, tender, preferred supplier panel contract) to be used and the reasons why this is the most appropriate method for acquiring the equipment.

8.1.5 Project implementation and timing

Timelines and key milestones for the implementation of the proposed equipment acquisition are outlined in the business case, including key dates and milestones for:

- funding approvals
- procurement steps, including equipment specifications, quotes/tendering, and evaluation
- ordering lead times
- transition
- training
- installation
- commissioning.

The following table provides an example of information to be included in the implementation plan:

Work step	Target completion date	Resource
<i>Example:</i> Develop detailed equipment specifications	30 January 2007	Technical working group
<i>Example:</i> Release tender	3 March 2007	Procurement manager

8.2 Funding strategy

The financial analysis undertaken as part of the options analysis will have identified the estimated total cost of the preferred option and the estimated increase/decrease in costs associated with the preferred option in comparison with the base case ('do nothing') option.

The business case should include a funding strategy that identifies the total funding requirement, both capital and recurrent, and all proposed sources of funding over the expected life of the equipment. It is important to note that the funding sources identified must be matched to the type of expenditure to be incurred, that is, capital funding sources may only be applied to capital expenditure.

The funding strategy identifies the steps and approvals required to secure the necessary funding to proceed with the equipment acquisition.

9 Approvals and sign-off

The business case should be endorsed by the relevant key stakeholders and have the appropriate level of sign-off by the department/service area head, project sponsor and executive management.

Section B: Full life cycle costing

10 Using the full life cycle costing template

10.1 Instructions

The evaluation of asset alternatives involves a number of factors including identifying the most appropriate technology, alignment to service needs and cost. From the cost perspective, comparisons of asset alternatives, whether at the feasibility or evaluation stage, are often based mainly on initial capital costs. **However, in order to better assess alternative asset choices and 'value-for-money' outcomes, ongoing operating and maintenance costs must be considered as they form a significant component of the total cost of ownership over the useful life of an asset.**

For the purposes of the full life cycle costing analysis, useful or effective life is to be based on whatever measure (such as depreciation rates or the life expectancy projection guidelines developed by the American Society for Healthcare Engineering) currently utilised by your health service. It is intended that preparing effective life guidelines will be investigated as part of the future development of the MEAMF.

Full life cycle costing is a process to determine the sum of all the costs associated with an asset or part thereof, including acquisition, installation, operation, maintenance, refurbishment and disposal. It is therefore a key component of any asset management framework.

The three key elements of life cycle costing are the:

- costs of owning and operating an asset
- period of time over which the costs are incurred
- discount rate that is applied to future costs to equate them with present day costs.

Decision making based on life cycle costing analysis often involves a combination of both quantitative and qualitative assessments. The quantitative results provide a baseline, but many other factors relevant to a decision may not be quantifiable in terms of costs. These qualitative assessments support the results of the quantitative analysis and will be addressed in the development of a business case template.

It is important to note that this template has been developed to identify the costs associated with a piece of equipment over its useful life. These costs may be funded from a number of different funding sources.

10.2 General guidance notes on the full life cycle costing template

The purpose of a full life cycle cost analysis is to enable better assessment of alternative asset choices and value-for-money outcomes through considering all the costs associated with an asset over its useful life, including acquisition, installation, operation, maintenance, refurbishment and disposal.

It is intended that the results of the full life cycle cost analysis undertaken with this template would form part of the quantitative analysis component of a business case supporting the acquisition of an additional or replacement medical equipment item or system.

This template has been designed to assist health services in undertaking a full life cycle cost analysis for new or replacement medical equipment items or systems. This template has been designed as a tool to be applied to all types and values of equipment.

It is suggested that this template be used for undertaking a full life cycle cost analysis for all items or systems either:

- **when requesting capital funding for additional equipment with a value in excess of \$100,000**
- **when seeking permission for leasing² medical equipment**
- **when requesting capital funding for replacement equipment (individual items, aggregates or systems) with a value in excess of \$600,000**
- **as requested by the department.**

However, it should be noted that this template can be applied to any analysis regardless of the value of the items or systems being considered. The analysis should cover a range of options, including maintaining the status quo (base case) and cover the full life cycle of the equipment being requested.

This template includes a number of cost items. Please complete the template for all cost items that have relevance and are material to the item of equipment to be purchased. **Materiality may be assessed based on the extent to which the cost item contributes to the total life cycle costs or as a percentage of the initial acquisition cost of the item or system.**

Where possible, the analysis should identify the total costs rather than incremental costs to ensure the total costs of the equipment are being captured in the analysis.

The comparative analysis on the summary sheet is based on discounted cash flows and is linked back to the individual options being considered. The template automatically calculates these values based on the discount rate entered on the assumptions sheet.

The discount rate to be used to calculate the present value for each option is based on the ten-year Treasury Corporation of Victoria (TCV) bond rate. This rate is published on the TCV website (www.tcv.vic.gov.au). The ten-year bond rate can be located under 'interest rates' in the 'market activity' section of the TCV website.

All amounts should be expressed exclusive of GST.

2. Applies to both finance and operating leases. The approval requirements for finance leases are outlined in the *Borrowing guidelines for public hospitals and community health centres* (www.health.vic.gov.au/borrowing/index.htm). The policy framework for entering into operating leases is set out in the *Prudential risk management framework for the State's financial markets activities* (Department of Treasury and Finance, March 2001). In section 6.2.6, the *Prudential risk management framework* states, "While there are no restrictions on operating leases, a financial evaluation must be performed on all operating leases greater than 12 months and for capital value worth more than one million dollars, to assess the cost of the proposal (refer Appendix 1 [of the *Prudential risk management framework*])".

10.3 Escalation factors

The template provides for the following different escalation factors to be applied to different revenue and cost items.

Cost escalation	The estimated annual percentage increase for non-salary-related costs included in the life cycle cost analysis. The current Consumer Price Index (CPI) or inflation estimate is an appropriate measure to use for this escalation factor.
Revenue escalation	The estimated annual percentage increase of the revenues generated by the item of equipment over the period of the life cycle cost analysis.
Salary escalation	The estimated annual percentage increase for salary-related costs included in the life cycle cost analysis. Enterprise Bargaining Agreements (EBAs) often provide provisions for annual increases in salary and wages. The relevant EBA increase is an appropriate measure for this escalation factor.
None	Use this escalation factor for any revenue or cost items that are expected to either remain fixed or have an uneven profile over the period of the life cycle. An example of an item that would be fixed over the period of the life cycle cost analysis is lease payments. An example of an item that may have an uneven profile over the life cycle costing period could include revenues that gradually increase over a number of years (due to volume growth) then remain fixed for the balance of the life of the equipment.

10.4 Revenues

External revenue	Revenues that are to be generated from external sources resulting from acquiring this item of equipment such as private patient fees. Do not include any funding-related revenues, such as increased weighted inlier equivalent separations (WIES) or capital grants associated received from the Department of Human Services.
Other revenue (specify)	Other significant revenues such as services performed on a fee-for-service basis for other health services associated with this item of equipment.

10.5 Residual values (of equipment to be acquired)

Residual value refers to the estimated value of the proposed equipment to be acquired at the end of its life. This would include any trade-in value on a subsequent replacement item of equipment. Where possible, residual values of similar items may provide a suitable guide to provide an estimate of any end-of-life residual value.

10.6 Initial acquisition costs

Purchase cost	Purchase price of the equipment. If the equipment is procured via a lease arrangement, please identify the annual lease payments in the leasing costs section of the template.
Delivery and installation costs	Costs associated with having the equipment delivered and installed on site. This includes freight, foreign exchange costs and transit insurance.
Integration costs	Costs associated with integrating and interfacing the equipment with existing systems and other equipment such as software updates and connections to IT systems.
Facility modifications	Costs associated with modifying the facilities to accommodate the medical equipment such as floor reinforcement, air conditioning upgrades, filtering systems and protective linings. These costs may also include any costs to remove the equipment being replaced.
Initial training	Initial training costs such as 'train the trainer', course materials, biomedical engineering/engineering/technical support training and service manuals.
Trade-in	Discounts or allowances provided by the supplier for any equipment traded in. Only include actual discounts received. Do not include the written-down value of the item being replaced.

10.7 Leasing costs (if applicable)

Lease payments	Annual leasing costs for the item of equipment being acquired (if purchased via lease arrangement).
Residual lease payments	Identify (if applicable) any lump sum residual payments ('balloon payments') payable at the end of the lease term.

10.8 Maintenance costs

Scheduled/preventative maintenance	Regular activities that need to be undertaken to maintain the equipment in safe working order such as preventative service kits. This would include additional resources required for in-house maintenance and/or maintenance contracts with external service providers.
Decontamination and waste disposal	Costs associated with cleaning, sterilisation, disinfection, decontamination and the disposal of hazardous waste such as radioactive materials or chemicals. Only include costs that are directly related to the item of equipment such as specific chemicals or decontamination equipment.
Other maintenance costs (specify)	Other significant maintenance costs associated with this type of equipment.

10.9 Repairs

Repairs/unscheduled maintenance	Unanticipated costs to maintain the effective life and safe working order of the equipment. For simplicity, and given that repairs are by definition unforeseen, an annual 'best' estimate of possible repairs is satisfactory. This estimate should be based, where possible, on past experience for the type/brand of equipment and reliability cited by the manufacturer.
Upgrades and refurbishments	Periodic updates to the equipment to maintain the equipment in accordance with statutory or the manufacturer's requirements.
Spare parts and accessories	Costs of replacement spare parts and accessories over the life of the equipment such as monitor cables.
Other repair costs (specify)	Other significant repair costs associated with this type of equipment.

10.10 Operating costs

Staffing costs	Salary and related on-costs associated with employing additional staff to operate and maintain the equipment. Only include costs of employing staff in addition to the existing base staffing.
Accreditation and certification	Costs associated with undertaking certifications and compliance audits and ensuring that the equipment meets professional standards.
Supplies and consumables	Costs of supplies and consumables directly used in operating the equipment.
Ongoing training	Costs for undertaking 'train the trainer', in-house biomedical engineering/engineering/technical support training, refresher course and the production/acquisition of training material.
Utilities	Energy costs directly associated with operating the equipment where these costs are material and can be reliably estimated.
Licences	Fees and charges associated with licences required to operate and maintain the equipment such as software.
Other operating costs (specify)	Other significant operating costs associated with this type of equipment.

10.11 End-of-life disposal costs (of equipment to be acquired)

These are costs to decommission, remove from service and safely dispose of the equipment at the end of its useful life such as removal costs, freight, 'make good' repairs to the facility. This should be the best estimate at the time of purchase. Where possible, disposal costs of similar items may provide a suitable guide to provide an estimate of these costs.

11 Full life cycle cost analysis – options development

11.1 Base case and alternative options

The life cycle cost analysis should compare a range of options, including retaining the existing equipment item or systems to deliver the service. This is sometimes referred to as the ‘do nothing’ option and provides a base case to use as a comparator against alternative options.

The base case option should include all relevant costs associated with continuing the existing service delivery utilising the equipment currently in place. These costs may include refurbishments, maintenance and the cost of implementing other risk-mitigation strategies to maintain the existing service delivery.

11.2 Review the results of the life cycle cost analysis

The life cycle cost analysis process is built on a range of assumptions about current and future cash flows for various types of costs. Each element of the analysis has varying degrees of accuracy and potentially has a different impact on the overall analysis results. It is therefore important to further explore the impact of changes in the values for key costs and how they impact on the overall results. This exercise is usually referred to as a sensitivity analysis.

Sensitivity analysis involves repeating the evaluation of the life cycle cost model for a variety of alternative data values. Alternative values are chosen based on the level of uncertainty of the data item and are often structured around a range of values such as best case, most likely case and worst case. For example, if the annual cost of maintenance was estimated to be \$12,000 (most likely case), but could range from \$5,000 (best case) to \$21,000 (worst case) it would be appropriate to investigate the effects on the overall analysis of using these alternative values.

12 Full life cycle cost analysis – assumptions

Medical equipment asset management framework

Assumptions

Estimated effective life of the equipment item or system

10 years

Indexation factors

2.5% pa Cost escalation (CPI)

2.5% pa Revenue escalation

3.0% pa Salary escalation

Discount rate

6.2% pa Nominal discount rate (ten-year TCV bond rate)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Escalation factors										
Cost	1.00	1.03	1.05	1.08	1.10	1.13	1.16	1.19	1.22	1.25
Revenue	1.00	1.03	1.05	1.08	1.10	1.13	1.16	1.19	1.22	1.25
Salary	1.00	1.03	1.06	1.09	1.13	1.16	1.19	1.23	1.27	1.30
Discount rate (nominal)	1.00	1.06	1.13	1.20	1.27	1.35	1.43	1.52	1.62	1.72
Present value factor (nominal)	1.00	0.94	0.89	0.83	0.79	0.74	0.70	0.66	0.62	0.58

Discount rate

The discount rate used to calculate the present value of each option is based on the nominal risk free rate. The risk free rate is the ten-year Treasury Corporation of Victoria (TCV) bond rate. This rate is published on the TCV website (www.tcv.vic.gov.au). The ten-year bond rate can be located under 'interest rates' in the 'market activity' section of the TCV website.

13 Full life cycle cost analysis – summary analysis

Medical equipment asset management framework

Summary life cycle cost analysis

Life cycle costs of options	Base case	Option 1	Option 2	Option 3
Revenues				
Revenues	-	-	-	-
Residual cash inflows	-	-	-	-
Total revenues/cash inflows	-	-	-	-
Costs				
Acquisition costs (net)	-	-	-	-
Leasing costs	-	-	-	-
Maintenance costs	-	-	-	-
Repair costs	-	-	-	-
Operating costs	-	-	-	-
Disposal costs	-	-	-	-
Total all costs/cash outflows	-	-	-	-
Total life cycle cost (present value)	-	-	-	-

14 Full life cycle cost analysis – option detail

Brief description of base case option:

Real revenues (\$'s)	Escalation factor	Total all years	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues							
External revenue	Revenue	-					
Other revenue (specify)	Revenue	-					
	Revenue	-					
	Revenue	-					
Total revenues		-	-	-	-	-	-
Residual values							
Salvage/disposal value of the equipment	None	-					
Total residual cash inflows		-	-	-	-	-	-
Total all revenues/cash inflows		-	-	-	-	-	-
Real costs (\$'s)							
Initial acquisition costs (non-recurring)							
Purchase price	None	-					
Delivery and installation costs	None	-					
Integration costs	None	-					
Facility modifications	None	-					
Training	None	-					
Total acquisition costs		-	-	-	-	-	-
<i>less</i> Trade-in of item being replaced	None	-					
Net acquisition costs		-	-	-	-	-	-
Leasing costs							
Lease payments	None	-					
Residual lease payments	None	-					
Total leasing costs		-	-	-	-	-	-
Ongoing operating and maintenance (recurring)							
Maintenance costs							
Scheduled/preventative maintenance	Cost	-					
Decontamination and waste disposal	Cost	-					
Other maintenance costs (specify)	Cost	-					
	Cost	-					
Total maintenance costs		-	-	-	-	-	-
Repairs							
Repairs/unscheduled maintenance	Cost	-					
Upgrades and refurbishments	Cost	-					
Spare parts and accessories	Cost	-					
Other repair costs (specify)	Cost	-					
	Cost	-					
Total repair costs		-	-	-	-	-	-
Operating costs							
Staffing costs	Salary	-					
Accreditation and certification	Cost	-					
Supplies and consumables	Cost	-					
Training	Cost	-					
Insurance	Cost	-					
Utilities	Cost	-					
Licences	Cost	-					
Other operating costs (specify)	Cost	-					
	Cost	-					

Please note that even though the base case option template is shown above, the same template is used for each of the options considered as part of the full life cycle costing analysis.

Section C: Business case template

Medical equipment business case

Executive summary

Executive summary checklist

Ensure the following has been included:

- how the equipment or system will meet the identified service need
- alignment of the acquisition to the service objectives of the health service, as well as Department of Human Services and whole-of-government strategic directions
- the options considered for meeting the service need
- the short-listed options and the basis for the short listing
- rationale for the preferred option based on fitness for purpose, costs, benefits and risks
- readiness to implement and timeframes for implementation
- the life cycle costs associated with the preferred option
- the budgetary implications for the acquisition – both recurrent and non-recurrent – and how it will be funded
- planning for implementation including project management and governance, procurement strategy, post-implementation assessment and project risk management.

Description of medical equipment needs

Introduction and background

Strategic context

Policy statement/strategic objective	Degree of alignment (High/medium/low)	Evidence supporting degree of alignment

Strategic context checklist

- Clearly demonstrates alignment with strategic directions for service delivery.
- References to supporting documents are identified or included as attachments to the business case.

Service profile

Current service profile

Current service profile checklist

Ensure the following has been included, where relevant:

- types of services/procedures provided
- number of services/procedures provided
- service capacity
- waiting times for procedures
- patient profile and mix (public, private)
- service demand, utilisation, burden of disease
- condition, use and effectiveness of equipment (capacity to sustain service delivery)
- relationships with other service providers and models of care.

Future service profile

Future service profile checklist

Ensure the following has been included, where relevant:

- projected impact of policies and strategies on the delivery of health services and models of care
- projected service demand and utilisation trends
- estimated service/procedure capacity requirements
- types of services/procedures to be provided
- projected activity levels by service type/procedure
- workforce requirements.

Identified service need

Service profile indicators	Current	KPI/evidence to support current profile	Future	KPI/evidence to support future profile

Identified service need checklist

- Clearly outlines the gaps between the current service profile and the future profile.
- Outlines how these identified gaps can be overcome through the proposed equipment acquisition.

Option evaluation

Summary of options

Options development

Process for option development

Options development checklist

- A range of options to meet the identified service need have been developed.
- The process and criteria for short-listing options has been documented.
- A ‘do nothing’ option has been included in the short list.

Option analysis

Qualitative analysis

Evaluation criteria	Base case ('do nothing' option)	Option 1	Option 2	Option 3
Total score				
Average score				

Qualitative analysis checklist

- Evaluation criteria have been developed and documented.
- Appropriate weightings have been applied to each criterion.
- Each option has been evaluated and scored against the evaluation criteria.

Financial analysis

Life cycle costs of options	Base case ('do nothing' option)	Option 1	Option 2	Option 3
Revenues				
Residual value				
Total revenue				
Acquisition costs				
Leasing costs				
Maintenance costs				
Repair costs				
Operating costs				
Disposal costs				
Total costs				
Total life cycle cost (present value)				
Score				

Financial analysis checklist

- Full life cycle costing template completed and included as an attachment to the business case.
- Summary data presented in tabular form.
- Each option has been scored.

Overall analysis

This section should summarise the qualitative and financial analysis and provide commentary on the overall scores of the various options.

	Base case ('do nothing' option)	Option 1	Option 2	Option 3
Qualitative analysis				
Weighted qualitative analysis score (x%)				
Financial analysis				
Weighted financial analysis score (y%)				
Combined weighted score				

Overall analysis checklist

- Weightings determined for quantitative analysis and financial analysis.
- Scores calculated based on weightings.
- Summary analysis included.
- Options ranked.

Preferred option

Preferred option checklist

- Preferred option has been documented in detail.
- Reasons for being considered the preferred option have been documented.

Implementing the preferred option

Project management and implementation

Project management and governance

Project management and governance checklist

- Organisational arrangements have been (or will be) implemented to manage and support the project.
- Any internal and external resources required to support the project have been identified.
- Reporting and monitoring processes have been put in place.

Project risk management

Risk description	Likelihood of occurrence	Consequence	Mitigation strategy

Risk management checklist

- Key risks have been identified and rated and recorded in a risk register.
- Mitigation strategies have been developed and costed (where possible).

Transition planning

Transition planning checklist

- Transition issues have been identified and documented.
- Strategies to manage the transition issues have been outlined.

Procurement

Procurement checklist

- Procurement method determined.
- Rationale for the proposed procurement method has been documented.

Project implementation and timing

Work step	Deadline	Resource

Project implementation checklist

- Key work steps have been identified.
- Resources required have been identified and secured.
- Realistic timeframes and milestones have been determined.

Funding strategy

Funding strategy checklist

- Funding requirements fully costed.
- Proposed funding strategy and sources documented.
- Steps and approvals required to obtain funding have been documented.

Approvals and sign-off

Approvals checklist

- Documentation has been provided to the relevant parties/delegated officers.
- Endorsements from key stakeholders and signatures obtained from relevant authorised/delegated parties

