

TEAM-HF Costing Tool

INTRODUCTION

Tools for Economic Analysis of Patient Management Interventions in Heart Failure (TEAM-HF) is a project supported with funding from the National Institute of Nursing Research (NINR) at the National Institutes of Health (NIH). As part of this project, we developed a costing tool that can be used by research groups or healthcare managers to systematically apply measures of resource use and estimate costs associated with implementing and maintaining a patient-focused intervention (e.g. disease management program).

The tool integrates sound economic principles to generate comprehensive cost estimates which could be useful in setting payment rates, contract negotiations, forecasting costs with program expansion or contraction, and identifying ways to improve the efficiency of existing programs. Because the tool integrates sets of standardized unit costs, cost estimation with this tool facilitates 'apples-to-apples' comparisons across programs. In recognition that cost inputs vary across sites, the tool also allows for customization of unit costs and provides side-by-side comparisons of results based on standardized vs. customized unit costs.

Resource categories include Personnel, Facilities, Equipment, Supplies and Incentives, and Miscellaneous items.

OVERVIEW

This section provides an overview of the main components of the TEAM-HF Costing Tool. It also describes terminology used throughout and the options for costing methods. Please review this section before getting started with TEAM-HF Costing Tool.

Terminology

Encounter: For the purposes of this costing tool, an 'encounter' represents a one-on-one session with a patient. The session could take place face-to-face, over the phone, or by some other means (e.g. web-based interaction).

Intervention/Program: The terms 'intervention' or 'program' are used interchangeably throughout the costing tool. Both terms refer to the mix of services or interactions that comprise the 'intervention' or 'program'.

Descriptions and Costing Options

The 'Descriptions and Costing Options' worksheet is used to classify the type of patient-focused program being assessed and the options provided for cost estimation. **This is the FIRST PAGE that must be completed for each costing exercise. Note that the information requested in this worksheet will vary according to the options selected in the drop-down boxes.**

The TEAM-HF Costing Tool was developed to estimate costs for three types of scenarios based: (1) on whether patients are participate in the program for a fixed period of time (e.g. an 8-week program) or indefinitely (e.g. until patients drop out or die) and (2) whether you would like to estimate costs for a given number of patients (e.g. a cohort of 100 patients) or for a program that continues to enroll new patients on an ongoing basis. **The 3 types of scenarios are described below:**

(i) Fixed duration per patient, single cohort

This scenario represents a program in which a given number of patients are enrolled for a fixed period of time or a fixed number of 'encounters' (e.g. an 8-week disease management program for a cohort of 30 patients).

This scenario would be appropriate to estimate costs in the setting of a randomized trial.

The costing tool estimates the total cost for the intervention for the cohort, the average cost per patient, and the average cost per patient per week.

If you choose this option, you will be prompted to provide the following inputs:

- Duration of program per patient
- Number of patients per cohort

(ii) Fixed duration per patient, ongoing accrual

This scenario represents a program in which individual patients are enrolled for a fixed period of time or a fixed number of 'encounters', and the program is continually accruing new patients (e.g. a disease management program that enrolls patients for an 8-week disease management program after their first hospitalization for heart failure).

The costing tool estimates the total cost of the program on a yearly or weekly basis, the average cost per patient per year, the average cost patient per week, and the average cost per patient.

If you choose this option, you will be prompted to provide the following inputs:

- Duration of program per patient
- Total number of patients accrued in the program over one year

(iii) Ongoing duration per patient, ongoing accrual

This scenario represents a program in which patients continue participation for a non-specified duration (e.g. ongoing, chronic) and the program is continually accruing new patients (e.g. a disease management program in which patients participate until they drop out or die).

The costing tool estimates the total cost of the program on a yearly or weekly basis, the average cost per patient per year, and the average cost per patient per week.

If you choose this option, you will be prompted to provide the following input:

- Total number of patients participating in the program over one year.

A variety of costing options have been built into the TEAM-HF Costing Tool to estimate costs for different kinds of resources. The sections below describe these options and refer to their corresponding worksheets.

Personnel Costs

Personnel typically account for the majority of costs in the provision of behavioral or educational interventions. Personnel can include individuals that deliver the intervention to patients as well as other individuals who have little to no contact with patients (e.g. administrative staff). Because personnel time associated with the intervention is critical to accurate cost assessment, the personnel costing worksheets are structured to prompt users to apply comprehensive time inputs to estimate personnel costs. You may choose to **estimate personnel costs** using one of the two methods described below:

When estimating personnel costs, you may choose to include or exclude time spent on research activities on the 'Descriptions and Costing Options' worksheet.

(i) Personnel Top-down Method

With this method, a top-down approach to cost estimation is used. It is based on estimates of weekly time devoted to program activities by physicians, nurses, or other health care professionals or administrative staff. If this option for assigning costs to personnel time is used, the corresponding spreadsheet requires 3 estimates of time for each type of personnel:

- (1) hours per week spent in contact with patients (by phone, face-to-face, etc.)
- (2) hours per week spent on other (non-research) activities associated with the program (e.g. prep-time, documentation)
- (3) hours per week spent on research activities associated with the program
- (4) number of each type of personnel

(ii) Personnel Bottom-up Method

With this method, a bottom-up approach to cost estimation is used. This method begins at the encounter level using estimates of time spent by each type personnel for each encounter. If this option for assigning costs to personnel time is used, the corresponding spreadsheet requires 5 estimates for each type of personnel:

- (1) number of encounters with patients per week
- (2) minutes spent in contact with patient per encounter
- (3) minutes spent without patient per encounter on related activities (e.g. prep-time, documentation)
- (4) hours per week spent on research activities associated with the program
- (5) number of each type of personnel

Personnel time devoted to research activities

When conducting a study to evaluate the effects of an intervention such as a disease management program, personnel involved in providing the intervention may also be involved in research-related activities. Activities would be considered to be research-related if they would not have taken place outside the setting of a research study. Examples may include completing materials for the review by an Institutional Review Board, drafting or reading a study protocol, or writing scientific abstracts. In some cases, it may be difficult to distinguish between research-associated activities and activities involved in providing the intervention. One example is data collection. If the data being collected could influence clinical decisions or use of medical resources in any way, we would consider this part of the intervention since it may have an impact on patient outcomes.

The user can choose to include or disregard research-associated costs in the calculation of total costs on the 'Descriptions and Costing Options' worksheet.

Facility Costs

Facilities represent the physical locations required to provide the intervention (e.g. office space, clinic examination rooms, etc.).

The user can choose to include or disregard facility costs on the 'Descriptions and Costing Options' worksheet.

The user may choose to estimate facility costs using one of the three methods described below:

(i) Fixed percentage based on personnel cost

With this method, costs for facilities are estimated as a fixed percentage of the total personnel costs, estimated using either the 'Top-down' or 'Bottom-up' methods described above for personnel costs. This method is a 'short-cut' approach to estimating facilities costs as it does not require any detailed information about the space required to provide the intervention.

(ii) 'Cost-per-square-foot' method

With this method, costs for facilities are based on estimates of square feet used by the program and the percentage of time the space is used by the program. This method also provides an option for the user to apply an 'add-on percentage' to assign costs for utilities and other overhead costs. This method requires the greatest amount of information from the user to estimate facility costs.

(iii) 'Off-the-shelf' method

With this method, standardized estimates of square footage for each type of space are applied. For this method, the user enters to the number of each type of space required (e.g. 2 offices, 1 examination room) and the percentage of time the space is used to deliver the program. When using this method, costs for utilities and other overhead are already included in the estimated facility costs.

Equipment Costs

Equipment costs represent resources that are used across multiple patients, but not depleted during the course of the intervention. Examples of equipment may include a computer program (i.e. software) designed to facilitate the delivery of a disease management program, computers, office furniture, or medical equipment such as sphygmomanometers or scales. Although many of these costs are incurred before an intervention begins, these costs should be allocated to the intervention itself as equipment costs (not start-up costs).

Costs for equipment are annuitized over time representing the period of usable life for each resource. With our standardized units, we apply an annual interest rate of 5% and years of usable life ranges from 5 years for computers and medical equipment to 7 years for office furniture.

The user can choose to include or disregard costs for equipment on the 'Descriptions and Costing Options' worksheet.

Supplies and Incentives

Supplies and incentives are considered variable costs because they increase with each additional encounter completed or each new patient enrolled. Examples of supply costs incurred with each patient encounter could be for patient incentives to time spent participating, reimbursement for parking, educational materials, or medications provided at each visit. Examples of supply costs incurred with each new patient enrolled could include medical supplies such as a blood pressure monitor or scale for daily, at-home monitoring, or patient education materials that are provided for each newly enrolled patient.

The user can choose to include or disregard supply costs on the 'Descriptions and Costing Options' worksheet.

To assign supply costs at the encounter level, it is necessary to provide an estimate of the total number of patient encounters completed per week.

Also, please note that you may enter numbers with decimal places in the 'Quantity' column to represent supplies that are provided to proportions of patients (e.g. medications provided at 50% of encounters (enter 0.5)).

Miscellaneous Costs

Miscellaneous costs are considered fixed costs because their cost is not directly associated with the number of individuals enrolled in the program or the number of encounters. The miscellaneous cost worksheet can be used to account for fees, services, or other resources not accounted for elsewhere in the model. Examples of common miscellaneous costs include professional licensing fees, professional training and travel, and other resources such as subscriptions to medical journals or fees to professional societies. Miscellaneous fees can also be used to account for paid consultants and contracted services.

Please enter the estimated annual cost for each item. The worksheet can be customized to include various types of miscellaneous costs.

Start-up costs

Start-up costs represent costs for personnel time and expenses incurred during the preparatory period, i.e., before the intervention actually begins. Start-up costs would represent costs associated with training personnel, developing intervention materials, and advertising or other outreach activities necessary to initiate the program.

Start-up costs represent costs that are one-time costs and consumed during the start-up period. In some cases, it may be difficult to determine whether resources should be classified as start-up costs or integrated into the cost of the program (e.g. shared equipment). An example is a capital asset like a computer system designed to facilitate the delivery of a disease management program or a van to transport patients to and from a clinic. Although these costs must be incurred before the program can begin, they **SHOULD NOT** be considered start-up costs. These costs would be considered shared equipment costs that would accrue to the cost of the intervention.

The user can choose to include or disregard start-up costs on the 'Descriptions and Costing Options' worksheet. Because the Start-up Costs worksheet contains all types of resources, it may be preferable to complete this worksheet last.

When choosing to include start-up costs, the costing tool allows the user to specify the number of years over which start-up costs will be allocated for both program types for which accrual is ongoing. For the "Fixed duration, single cohort" scenario, all start-up costs are allocated to the cost of the intervention.

Total Costs

The "Total Costs" worksheet provides estimated total costs for the intervention as well as a breakdown for each type of resource. The results are presented using both standardized and customized unit costs for head-to-head comparisons. This page also calculates the proportion of total costs represented by each type of resource.

Unit Costs

Unit costs represent the price weights applied to each unit of resource use. To facilitate cost comparisons across programs in the literature, the TEAM-HF Costing Tool has an integrated set of standardized unit costs. In recognition that many of these costs will not be applicable across settings or institutions, the Costing Tool was developed to allow the user to enter their own 'customized' unit costs to estimate costs specific to a given intervention. Each of the costing spreadsheets described above is designed to allow for a side-by-side comparison of costs derived using standardized unit costs and customized unit costs.

Revenues

The revenues work sheet is optional. It allows users to enter annual revenues or funding from any source. This information is used to compare revenues and costs to determine program profits or losses. This information is reported in the Costs and Revenues worksheet.

Costs and Revenues

The Costs and Revenues worksheet is similar to the Total Cost worksheet with the exception that it includes rows to represent revenues and calculations of profits or losses.

Standardized and Customized Units

Unit costs represent the price weights applied to each unit of resource use. To facilitate cost comparisons across programs in the literature, the TEAM-HF Costing Tool has an integrated set of standardized unit costs. In recognition that many of these costs will not be applicable across settings or institutions, the Costing Tool was developed to allow the user to enter their own 'customized' unit costs to estimate costs specific to a given intervention. Each of the costing spreadsheets described above is designed to allow for a side-by-side comparison of costs derived using standardized unit costs and customized unit costs.

Standardized Unit Costs: This worksheet contains a listing of unit costs and assumptions applied in the estimation of standardized cost estimates throughout the worksheets described above. References are provided for all unit costs and assumptions for specified resource. In instances where you may have added a given resource type (i.e. in rows listed as 'Other (please specify)'), you should locate the corresponding cell for its unit cost and enter it there.

Customized Unit Costs: The worksheet has the same structure as the 'Standardized Unit Costs' worksheet. This worksheet allows the user to enter unit costs and assumptions applicable to their setting or institution to estimate costs specific to their setting. Each of the costing spreadsheets described above is designed to allow for a side-by-side comparison of costs derived using standardized unit costs and customized unit costs.

TIPS FOR USING THE COSTING TOOL

- 1. The 'Descriptions and Costing Options' Worksheet should be completed first.** Drop-down boxes are provided for costing options that are available. For some questions, users will be required to enter numerical estimates.

- 2.** On each of the worksheets representing various sets of resources, the cells shaded LIGHT BLUE represent 'Inputs' to be completed by the user and the cells shaded YELLOW represent calculated costs. Please DO NOT enter any values in the cells that are highlighted in YELLOW. The tables at the bottom of each worksheet represent estimated costs for the type of program you are evaluating. It is possible to calculate costs for only one type of program at a time.

- 3.** Many of the tables included in the worksheets provide lists of various types of resources that are typically used in the delivery of patient-focused interventions. However, in many cases, the user will need to add additional types of resources. These should be entered in the rows labeled "Other (please describe)". Because these resources were not pre-programmed, corresponding standardized unit costs are not populated for these resources. This will be evident because the calculated costs will be equal to \$0. To integrate costs for these resources, the user can either add the unit cost of the resource in the corresponding cell(s) of the 'Standardized Units' or 'Customized Units' worksheets.

- 4.** The facilities worksheet allows one to provide inputs for the 'off-the-shelf' and 'cost-per-square-foot' methods for cost estimation. However, facility costs will only be estimated for the method selected in the 'Introduction and Overview' Worksheet. This also applies to the facility cost section on the 'Start-up Costs' Worksheet.

- 5.** To generate customized cost estimates, the corresponding cells in the 'Customized Units' Worksheet must be completed.

- 6.** If you see "#DIV/0!" in results cells, it may be because you did not fully complete all of the required items in the 'Descriptions and Costing Options' worksheet or the 'Standardized Units' or 'Customized Units' spreadsheet. Please double-check these worksheets to ensure that all required items have been completed.

ISSUES TO CONSIDER WHEN DEVELOPING COST ESTIMATES

The TEAM-HF Costing Tool can be used to estimate costs for use in an economic evaluation (**economic costs**) and it can be used to estimate costs for managerial uses (**accounting costs**). In many cases, the assumptions necessary to estimate costs will differ.

Economic Costs: For use in an economic evaluation (e.g. cost-effectiveness analysis) conducted from the societal perspective, estimated costs should represent 'opportunity costs' often defined as the monetary value of the resources in their next best use. This means that every resource should be assigned a fair market cost even if the item (or time) is donated, provided free-of-charge, or at a reduced rate. Economic costs also include the value of resources that exist within a practice or institution that are made available to the intervention. For a patient-focused intervention, this could include facilities, equipment, or personnel in a practice that are used in the provision of the program.

Accounting Costs: From a managerial or accounting perspective, the estimated costs represents actual payments made for resources (e.g. facilities, equipment, supplies, etc.). For a patient-focused intervention, one may wish to only consider the incremental costs attributable to the program, which may be limited to costs for additional personnel hours or supplies provided to patients enrolled in the program. When conducting an economic evaluation from the provider perspective, use of accounting costs would be appropriate. However, it should be recognized that if the program were scaled up to provide the intervention to more patients, excess capacity that allowed for 'free' services or facilities may no longer be available. In such a case, additional costs for additional facilities, personnel and equipment must be considered.