

**Canadian Coordinating Office for Health Technology Assessment
Office Canadien de Coordination de l'Évaluation des Technologies de la Santé**



**A GUIDANCE DOCUMENT
FOR THE
COSTING PROCESS**

Version 1.0

AUGUST 1996

**PROJECT DIRECTOR
*JEAN-FRANÇOIS BALADI***

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ABBREVIATIONS

CCOHTA	Canadian Coordinating Office for Health Technology Assessment (Ottawa, Ontario)
CIHI	Canadian Institute for Health Information (Ottawa, Ontario)
CMG TM	Case Mix Groups TM
DPG TM	Day Procedure Groups TM
DRG	Diagnosis-Related Groups
HCCI	Health Care Coordination Initiative - Secretariat (Ottawa, Ontario)
ICU	Intensive Care Unit
JPPC	Joint Policy & Planning Committee
LOS	Length of Stay
PMPRB	Patented Medicine Prices Review Board (Ottawa, Ontario)
RIW TM	Resource Intensity Weights TM
VON	Victorian Order of Nurses
WCB	Workman's Compensation Board

CMGTM, DPGTM, and RIWTM are registered trademarks of the Canadian Institute for Health Information

DEFINITIONS

Case Mix Groups and *Day Procedure Groups* identify groups of patients that are similar in type and in terms of resources used as measured in patient days of care. (Source: CIHI).

Resource Intensity Weights are weights that are developed to capture resource use by each Case Mix Group (Source: CIHI). A CMG with a higher RIW is believed to consume more resources than a CMG with a lower RIW.

Incremental Cost is the difference between the costs of two options.

Marginal Cost is the additional cost incurred by increasing the volume of output by one additional unit.

Opportunity Cost is the value of the goods and services foregone by not putting the resources to use in the next best alternative.

Overhead Cost is the cost assigned to the use of resources which are used in the production of goods or services but which cannot be easily attributable to the provision of one particular service (e.g., heating or administrative charges).

Capital Cost is the cost attributable specifically to the capital used in the production of goods and services (e.g., land).

Perspective of the analysis is the viewpoint from which the analysis is conducted and costs are measured.

The *MIS Guidelines* are guidelines that provide decision-makers in health care with a way to collect and analyze detailed information about a health care facility's costs and performance (source: CIHI).

INTRODUCTION

This document is intended to help researchers determine costs when undertaking economic evaluations of health care in Canada. It is not a cost accounting document but provides guidance for economic evaluations and as such, can be used along with the *Guidelines for the Economic Evaluation of Pharmaceuticals: Canada 1994* (CCOHTA, 1994). (Subsequently referred to herein as the *Guidelines*).

On the subject of costing, the *Guidelines* distinguish three separate issues in addition to the principle of discounting. They are *Cost Identification*, *Cost Measurement* (which will be referred to in this document as *Identification of Resources* and *Measurement of Resource Use*, respectively) and *Cost Valuation* (Items 17, 18 and 19 of the *Guidelines* summary). The present document summarizes Item 17 and elaborates on Items 18 and 19 which deal with the measurement and valuation of the resources used when providing health care services.

This document has three sections. Section 1 contains general guidance for the costing process. It identifies possible biases that could distort cost estimates, and offers practical tips on how to minimize them. Section 2 elaborates on the measurement and valuation of resources. It identifies categories of services, provides options for their estimation, gives guidance as to when each option is acceptable, discusses some issues that surround each option and suggests sources of information. Section 3 suggests a format for the reporting of cost estimates.

This guidance document is intended to be a “living document” because costing methods continuously develop and sources of information change. This version is a first iteration in a process of compiling a practical guide for researchers. How this document will grow will depend in large part upon the feedback and input received. Most of its aspects need to withstand the tests of time and practical applicability. Any suggestions for improvement are welcome.

The essential elements of this document are derived from the *Guidelines*, from general economic principles as well as from deliberations held at CCOHTA by an advisory committee. This committee was comprised of Drs. Bernie O’Brien (Chair, McMaster University), Philip Jacobs (University of Alberta), Devidas Menon (CCOHTA), and André Lalonde (CIHI), Ben Faienza (Bayer Inc.), Doug Coyle (Ottawa Civic Hospital) and Jean-François Baladi (CCOHTA).

Additional discussion of costing methods can be found in the following references:

- Drummond M., Stoddart G., Torrance G. 1987. **Methods for the Economic Evaluation of Health Care Programmes**. Oxford: Oxford University Press.
- Gold, M.R., Russell, L.B., Siegel, J.E., Weinstein, M.C. (eds.). 1996. **Cost-Effectiveness in Health and Medicine**. Oxford: Oxford University Press.
- Luce, B.R., Elixhauser, A. 1990. **Estimating Costs in the Economic Evaluation of Medical Technologies**. *International Journal of Technology Assessment in Health Care*. 6: 57-75.
- Sloan, F.A. (ed.). 1995. **Valuing Health Care: Costs, Benefits, and Effectiveness of Pharmaceuticals and Other Medical Technologies**. Cambridge, UK: Cambridge University Press.
- Forns, J.R. 1996. **Glosario de Términos y conceptos de uso frecuente en la evaluación económica de medicamentos y programas sanitarios**. Spanish Glossary.

GENERAL GUIDANCE

The costing of health care interventions consists of three steps: the identification of resources, the measurement of resource use and cost valuation

IDENTIFICATION OF RESOURCES

Consists of identifying the resources that are consumed (or created) by the health care programme being evaluated.

- The clinical management and the event pathway relevant to the application of both the intervention being examined and the comparator intervention should be determined. This can be done by developing a decision tree for the intervention considered and all downstream events compared to the comparator intervention and its downstream events.
- The service or resource categories that are relevant to the event pathways should be identified. The enumeration of all events involved and resources used, even small ones, should be attempted.
- Depending on the perspectives taken, some services or resources will or will not be included in the analysis (for example, which direct health care costs and/or indirect costs are to be included or excluded).
- To analyze the effects of the health care programme from different perspectives (for example, first from a ministry of health and second, from a societal perspective), it will prove useful to present separately a list of resources consumed from each individual perspective as well as from the comprehensive societal perspective. However, care should be exercised in order to avoid double counting of resources.
- A decision will have to be made regarding the level of detail and precision that the analysis will require. For hospital in-patient care, for example, a decision as to whether a crude figure such as standard costs per Case Mix GroupTM (CMGTM) or per diem costs would be used, or whether micro-costing should be used instead, or whether ordinary ward costs should be used versus ICU costs. Guidance on this matter can be found in Section 2. But in general, the greater the effect the cost estimate will have on the result of the analysis, the more precise this cost estimate should be.

MEASUREMENT OF RESOURCE USE

Consists of determining the quantities of resources required for each intervention.

- A number of approaches can be followed which can be grouped under two broad categories.
 - Synthetic methods consist of using secondary data such as administrative databases, expert panel, retrospective chart reviews.
 - Primary data gathering or the prospective collection of data specifically for the study at hand either as part of a trial or as a study on its own.
- It often proves useful to measure (and then report) resource consumption in “natural units”, for example, number of physician visits, hospitalization days, number of each laboratory test. Being as detailed as possible is recommended.

- Whenever possible, resource consumption should be presented by category - inpatient hospital care, emergency room care, day surgery, outpatient visits (clinic and emergency), physician and other professional services, home care, long-term care, laboratory and radiology, medication, out-of-pocket costs and indirect costs.

COST VALUATION

Consists of assigning a price to the resources used.

- Either the source of the price that is chosen for each resource unit should be identified, or the method chosen to estimate this dollar value should be described in as much detail as is felt necessary. This explanation will allow the reader to assess the validity of the method.
- The price of the resource should approximate its opportunity cost (the value foregone by not putting this resource into the next best alternative use). Unfortunately, opportunity costs are not easily calculated. However, under certain assumptions regarding market conditions, the price of a resource can be considered a reflection of its opportunity cost.
- The price of each resource can vary by geographical location, by type of institution, over time and by category of patients and care provided. A study must (as much as possible) capture the cost of the intervention examined that is of concern to the stated audience (perspective). It must also reflect the cost for the relevant patient/population groups in the relevant intervention settings (e.g., ordinary ward cost versus ICU cost).
- An allowance for fixed capital and overhead costs should be made whenever applicable and necessary.
- In general, costs that are collected on a routine basis from various institutions are preferable to costs that are collected for a specific purpose from specific institutions.
- With respect to out-of-country studies, it is generally not sufficient to “Canadianize” them by simply using Canadian price weights. It is also necessary to justify that resource use has the same pattern in Canada. This can be achieved either through the conduct of a separate costing study, or through a validation process such as a Delphi panel. However, it must be remembered that these are ad hoc methods that are generally not satisfactory.
- The specific situation being examined, and the type of study being conducted will determine the level of detail of data that may be needed and available. If a multi-country randomized controlled trial (RCT) is just being started, detailed data can be collected. If data and model already exist, a “best” estimate for the cost of the intervention has to be obtained using one of the above mentioned methods.

Possible Biases in Estimating Costs

Jacobs et al., 1995 have identified three possible biases that could distort cost estimates. Minimizing these biases is one way of ensuring that cost estimates are appropriate.

Methods bias would result from the use of a costing method that yields cost figures that are not representative of the opportunity costs of the services concerned. This potential bias is assessed qualitatively as judgment has to be exercised, for example, in the assessment of the degree to which market imperfections can cause market prices to diverge from opportunity costs. As indicated earlier opportunity costs are not readily available and are approximated by prevailing prices. A further simplifying assumption results from the use of average costs instead of marginal (or incremental) costs. This is because there will always be a degree of arbitrariness in the distinction between variable versus fixed resources in a specified time period or as a result of changes in volume. In addition, methods used to allocate overhead costs over a number of services rendered are to varying degrees all arbitrary.

- Be as detailed as possible when identifying service units, e.g. number of physician consultations, minutes in an operating room.
- When market prices, shadow prices and fees are used, they should approximate opportunity costs or the market prices that would prevail under competitive conditions. In cases of market imperfections (such as conditions of monopolistic organization or regulated markets) adjustments to market prices have to be considered if possible.
- In general, data that are collected on a routine basis are preferable to data collected on a one-time basis.
- All relevant resource items (relevant to the chosen perspective) which are incremental to the intervention should be identified and measured. This includes overhead costs. Although it may be argued that the cost of resources should be valued by their marginal cost, an allowance for fixed cost should be made, unless otherwise justified. A rationale for this is that the appropriate frame for the analysis should be the long-run, and in the long-run all resources are variable.
- If the societal perspective is taken, then out-of-pocket and indirect costs should be included. On the other hand, transfer payments should not be included.

Case or service mix bias would appear if the costing method used does not take into account the severity of the patient's condition or case mix group and the resource consumption pattern specific to this category of patient and/or disease. In general, costs should reflect resource use in the specific patient group under consideration.

Site selection bias would result from the use of estimates derived from institutions that may not reflect the cost structure that prevails in the chosen perspective. Prices should be reflective of those that would prevail in the locations and settings where the intervention will take place or in the most efficient site. For example, if a technology is to be deployed in secondary level hospitals, costs should ideally be derived from this particular hospital group and not estimated from tertiary teaching hospitals. By using costs that are derived from a number of institutions and that are routinely set (as opposed to using costs that derived from a single institution or that are collected for a specific purpose) one would tend to minimize this bias. Another example of this bias may occur when resource use and cost estimates are derived from institutions that are located in a different geographic location than those where the technology will be implemented. In this example, the potential exists for differences in resource use and costs.

MEASUREMENT AND VALUATION OF RESOURCES

OPTIONS AVAILABLE, ISSUES TO CONSIDER AND SOURCES OF INFORMATION

In this section, the costing options for each resource category are presented, guidance as to when each option can be used is given, and issues surrounding each option are identified. Sources of information are also suggested for each resource category.

For most resource categories (goods or services), different costing options exist. Each costing option entails a certain amount of complexity, time and effort and yields a certain precision. Detailed (micro) costing is often an option. However, in some instances (see below) the use of cruder estimates may be sufficient. The challenge is to strike the appropriate balance between the need for precision and the avoidance of bias and the effort needed to provide the increased precision. Clearly, precise unbiased cost estimates are the ideal; similarly, imprecise biased estimates are the least valuable. The relative desirability of biased/precise estimates versus unbiased/imprecise estimates will, however, depend on the context. In some cases a precise but biased estimate might suffice. For instance if the rates of hospitalization for two interventions were known with some precision, a cost estimate on the cost of hospitalization that is precise but has a known bias (perhaps a per diem that underestimates the cost for the particular patient group) might provide enough information. In contrast, in other situations the lack of bias may be more important than the lack of precision. In certain respects, sensitivity analysis using Monte Carlo simulations and other techniques may be a partial substitute for the lack of precision.

Often, isolating the source of differences in the resources used by the alternatives examined (whether differences exist in the kind of service provided or in the number of units of the same service) can provide guidance as to which costing method is appropriate. One would then use a method that would capture these differences. For example, if the technology being examined results in changes in the length of hospital stay with no change to the kind of care being provided, then a daily hospital cost can be used (unless it is seriously biased). But if the technology results in the kind of care being altered over the same length of stay, then another technique (such as micro costing) should be used.

It is important to remember that the resource categories selected for costing as well as the costing method chosen need to be consistent with the chosen perspective.

Note: Although non-health care costs can be included in health economics studies, this document deals specifically with the costing of health care services.

Table 1: Inpatient Hospital Care

<p>OPTIONS From least precise to most precise</p>	<p>GUIDANCE</p>	<p>MAIN ISSUES</p>	<p>SOURCES OF INFO</p>
<p>Generic per diem</p> <ul style="list-style-type: none"> - These are daily rates (measured in dollars) that are set at the national, provincial or hospital level for different purposes. They are supposed to represent the average cost of one hospitalization day irrespective of a patient condition. - Hospitalization cost would then be calculated as: \$ per diem × LOS 	<p>Can be used when</p> <ul style="list-style-type: none"> - the probability of hospitalization varies but is relatively small, & - the type and nature of hospitalization is the same between the alternative interventions examined - there are very large differences in length of hospital stay 	<ul style="list-style-type: none"> - Crude measure often not representative of either average or marginal costs - Some per diem capture only operating expenses - Some per diem omit capital cost; most per diem omit the opportunity cost of land - Can suffer from a large case mix bias 	<ul style="list-style-type: none"> - individual hospitals - individual provincial governments - Provincial & national LOS for each CMG are available from CIHI - HCCI
<p>Specialty per diem (e.g. Oncology, ICU, specific wards)</p> <ul style="list-style-type: none"> - These are daily rates (measured in dollars) established for specific hospital departments, e.g., oncology or ICU. They are supposed to represent the average cost of hospitalization in the specific departments. 	<p>Can be used when the probability of hospitalization varies among the alternatives examined but is relatively small</p>	<ul style="list-style-type: none"> - Crude measures often not representative of either average or marginal costs - Specialty per diem may be difficult to obtain 	<ul style="list-style-type: none"> - individual hospitals - individual provincial governments
<p>Cost per weighted case (or cost per weighted day)</p> <ul style="list-style-type: none"> - by province - by hospital - Cost per weighted case (or cost per weighted day) are calculated either for specific provinces or for specific hospitals and are intended to capture the cost of hospitalization of a patient in a specific condition, usually classified according to CMGs or DRGs. 	<ul style="list-style-type: none"> - Can be used when the type of hospitalization differs (e.g., “with” versus “without” complications), or when hospitalization is for different treatments or diagnoses - Cannot be used when within CMG cost differences are sought - In some cases, and for certain diseases, a specialty per diem cost estimate may be more appropriate - Calculated by allocating aggregate (hospital or provincial) cost data according to RIWs - Some hospitals may not distinguish between inpatient & outpatient total expenditures 	<ul style="list-style-type: none"> - Case mix adjustment captures to a certain extent resources used by a particular group of patients and severity of conditions - One should however be aware of a possible site selection bias - CMGs are applicable to most provinces. Quebec uses DRGs - RIWs are national (not province specific) - At present, RIWs are based on Maryland (US) data and are not yet validated for Canada - Cost per weighted case can be obtained on a per province or per hospital basis 	<ul style="list-style-type: none"> - individual hospitals most probably have aggregate cost data - CIHI will be collecting provincial aggregate data, (HS1 & HS2 reports previously done by Statistics Canada) starting in 1996/97 - Preliminary cost figures per CMG for Alberta are available from CCOHTA (CCOHTA, 1994) - RIWs are available from CIHI - Provincial and national LOS per CMGs are available from CIHI

Table 1: Inpatient Hospital Care (Continued)

OPTIONS From least precise to most precise	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
<p>Patient specific costing</p> <ul style="list-style-type: none"> - Patient specific costing, or case costing, produce costs derived from tracking individual patients. They capture patient specific data as well as their associated cost specific information. - Regression models within CMGs by patient are also possible. 	<ul style="list-style-type: none"> - Should be used for uncovering “subtle” impact on types of hospitalization within the same case mix group, e.g., when services provided change. - Hospitals having implemented the MIS Guidelines global dimension should be able to provide reasonable figures. 	<ul style="list-style-type: none"> - Patient specific cost can be obtained by using actual figures. - Patient specific costing projects are currently underway in Ontario and Alberta. - Cost data is typically only available from the specific sites involved. - Validation of RIWs, using Canadian cost data, is being considered by CIHI. 	<ul style="list-style-type: none"> - Specific hospitals which compute cost weights which link actual workload units of resources used with financial data (e.g., Chedoke-McMaster Hospital). - Facilities involved in the Case Cost Project (undertaken by the JPPC). - A cruder (non evidence based) estimate may be obtained by using an expert panel to identify resource use.
<p>Micro Costing</p> <ul style="list-style-type: none"> - Micro costing is the process of determining, through time and motion studies, the actual utilization of each resource used in the production of a particular service. For example, calculating nursing time or counting number of events. 	<ul style="list-style-type: none"> - Should be used for uncovering “very subtle” differences - Identify all resources used (e.g., physician time, overhead, diagnostic tests), attach a cost to each service, and then multiply resource use by unit costs to obtain a measure of total cost 	<ul style="list-style-type: none"> - Micro costing is particularly well suited for determining the use of resources for a specific service. - Also well suited for determining nursing dependency weights. 	<ul style="list-style-type: none"> - Time and motion studies. - Activity sampling <p>May involve 3 levels of detail.</p> <ul style="list-style-type: none"> - the quantity of each resource is known - hospital/researcher could extract the info from chart reviews and/or computerized utilization charts - researcher could extract the info

Table 2: Day Surgery

OPTIONS From least precise to most precise	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
<p>The same options as in-patient hospital care apply, i.e.,</p> <ul style="list-style-type: none"> - cost per stay - cost per specialty stay - cost adjusted to the case mix (by DPG) - case costing - micro costing 	<ul style="list-style-type: none"> - The same criteria as in-patient hospital care apply. - Look especially at the time spent and at the kind of procedures performed during the stay. If the procedures performed are the same but the time spent changes, then case costing is needed. Measure time by the hour. Whenever changes in procedures occur, micro costing is required. 	<ul style="list-style-type: none"> - The same options and issues as in-patient hospital care apply. - RIWs are national. No province specific figures are computed. 	<ul style="list-style-type: none"> - 7 provinces report Day Procedure Groups (DPG) - CIHI publishes RIWs for DPGs. - Preliminary cost figures for Alberta are available from CCOHTA (CCOHTA, 1994). - Same sources of info apply for the other options. - HCCI

Table 3: Outpatient Visits (Clinic and Emergency)

OPTIONS	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
<p>Cost per encounter by type of visit</p>	<ul style="list-style-type: none"> - Can be used if the cost is not believed to be an important component in the total cost of the alternatives studied. - If the alternatives studied involve the same kind of visits. 	<ul style="list-style-type: none"> - Costs are facility specific. - Cost of emergency room visits are usually difficult to estimate. - Can be estimated by a crude measure such as: budget/number of visits. 	<ul style="list-style-type: none"> - Estimates per type of visit can be obtained from each individual facility. - Preliminary cost figures for Alberta are available from CCOHTA (CCOHTA, 1994). - HCCI
<p>Cost per encounter adjusted by a case severity index</p>	<ul style="list-style-type: none"> - Can be used if the cost is not believed to be an important component in the total cost of the alternatives studied. 	<ul style="list-style-type: none"> - Ideally costs should be adjusted to the case mix. - A patient classification scheme (such as Alberta's) can be used to weight cost per encounter. 	<ul style="list-style-type: none"> - Difficult to obtain presently. - The new HS1-2 reports forthcoming from CIHI will be able to provide aggregate cost information that would help compute costs per visits.
<p>Case Cost Estimates</p>	<p>Should be used when the different alternatives examined involve a different mix of visit types.</p>	<ul style="list-style-type: none"> - At present patient specific cost estimates may not be readily available. 	<ul style="list-style-type: none"> - Patient specific costs are forthcoming from a number of the Case Cost Project sites.
<p>Micro Costing</p>	<ul style="list-style-type: none"> - Should be used when differences in cases are of importance. - It is the preferred method at the present time especially in light of the heterogeneity of clinic visit types and resource use. - The purpose is to identify all resources used (e.g., physician time, overhead, diagnostic tests, attach a cost to each service, and then multiply resource use by unit costs). 	<ul style="list-style-type: none"> - Micro costing is particularly well suited when the purpose is to uncover marginal use of resource among alternatives. 	<ul style="list-style-type: none"> - Time and motion studies.

Table 4: Physician and Other Professional and Therapeutic Services

OPTION/SERVICE	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
Physician fees or salaries	<ul style="list-style-type: none"> - Cost per service is all that is available at present. - Aggregate data on National Health expenditure can provide some indirect means of estimating aggregate costs of some professional services. 	<ul style="list-style-type: none"> - Fees are assumed to take care of full cost recovery. - Comparisons of physicians fee schedules across provinces should be done with care as fee schedule differ. - In some instances, physicians are paid on a salary basis. 	<ul style="list-style-type: none"> - Individual provinces' fee schedules - CIHI National Physician Database - National Health expenditures data are compiled by CIHI.
Nursing services provided in the community	Cost per encounter is all that is available at present.	<ul style="list-style-type: none"> - Provincial and regional VON negotiate fees for community services for given regions. 	<ul style="list-style-type: none"> - Individual provinces - V O N offices throughout the country
Physiotherapy	Cost per encounter is all that is available at present.	<ul style="list-style-type: none"> - Depending on the perspective taken, any deductible or co-payment might have to be taken into account to reach full cost. 	<ul style="list-style-type: none"> - Some provinces have fee schedules. - WCB rates can also be used. - Private third party payers (insurance companies)
Chiropractic	Cost per encounter is all that is available at present.	<ul style="list-style-type: none"> - Depending on the perspective taken, any deductible or co-payment might have to be taken into account to reach full cost. 	<ul style="list-style-type: none"> - P r o v i n c i a l associations - Private third party payers
Other: optometry, dental, podiatry, naturopathy and massage	Cost per encounter is all that is available at present.	<ul style="list-style-type: none"> - Depending on the perspective taken, any deductible or co-payment might have to be taken into account to reach full cost. 	<ul style="list-style-type: none"> - P r o v i n c i a l associations - Private third party payers - Private sector prices

Table 5: Home Care

OPTION/SERVICE	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
Professional home visits e.g., home dialysis, home oxygen <ul style="list-style-type: none"> - Homemaking - Personal care - Licensed Practical Nurse - Registered Nurse - Physiotherapist - Occupational therapist - Recreational therapist - Social worker 	<ul style="list-style-type: none"> - Service fees are the preferred method to use at this time. - Use of an hourly rate for professional and support services can also be an option. 	<ul style="list-style-type: none"> - No classification system is yet in place to account for case mix differences. - Some provinces are working on a classification system to capture case mix differences in home care. - Some provinces track only total costs. 	<ul style="list-style-type: none"> - VON offices for community nursing - Canadian community care - Some provinces have fee schedules (Alberta, Ontario and Quebec Ministries of Health). - National health expenditure survey might shed some light. - Preliminary cost estimates for Alberta taken from Capital Health Authority are available from CCOHTA (CCOHTA, 1994).

Table 6: Long-Term Care

OPTION	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
<ul style="list-style-type: none"> - Per diem rate - Per diem rate adjusted by some classification of severity of condition. 	<ul style="list-style-type: none"> - Daily costs should be used, ideally adjusted by some measure of resource utilization or intensity of care. - Alberta classification could provide a basis for resource use adjustments. - However, precision may not be very important for events occurring farther in time. 	<ul style="list-style-type: none"> - In some provinces, per diem rates are adjusted by level of care. - In some provinces, co-payments exist and should be considered during costing if appropriate to the perspective taken. - Issue of precision takes another dimension here since discounting future events reduces their impact. For example, using generic or specific per diem rates for rehabilitation 30 years from now at 5% discount would not make much difference. 	<ul style="list-style-type: none"> - Flat per diem rates are available for each province. - HCCI - Preliminary cost estimates for Alberta are available from CCOHTA (CCOHTA, 1994). - Ontario figures are available from the provinces ministry of Health long-term care office.

Table 7: Laboratory, Radiology and Other Diagnostic Tests

OPTION/SERVICE	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
<p>Laboratory and diagnostic tests</p>	<ul style="list-style-type: none"> - Cost per test/procedure should be used. - Public and private lab cost schedules exist. Although the perspective of the analysis should determine which one to use, there are some opinions that favor the use of private lab cost schedules. 	<ul style="list-style-type: none"> - Be sure not to double count. For example, laboratory cost may already be included in inpatient hospital care. - The two sets of costs, public versus private lab costs, imply that a choice has to be made. - In some provinces, co-payments exist and should be considered during costing if appropriate to the perspective taken. 	<ul style="list-style-type: none"> - Fee schedules are available for each province other than Alberta. - HCCI
<p>Radiology</p>	<ul style="list-style-type: none"> - Cost per exam should be used. 		<ul style="list-style-type: none"> - Provincial fee schedule - In some provinces, private fee schedules exist.

Table 8: Medication

OPTION/SERVICE	GUIDANCE	MAIN ISSUES	SOURCES OF INFO
Hospital provided drugs	<ul style="list-style-type: none"> - Should be costed at the invoice cost plus an allowance for administering the drug plus pharmacy overhead if necessary (e.g., in the case of special storage). - If hospital prices are not available, pharmacy prices could be used (possibly adjusted downward). 	<ul style="list-style-type: none"> - Make sure not to double count overhead costs. 	<ul style="list-style-type: none"> - Hospital pharmacies - Hospital pharmacy surveys
Community provided drugs	<ul style="list-style-type: none"> - Should be costed at cost to 3rd party payer (government or private) plus an allowance for a mark-up and a provincially determined dispensing fee. - For reimbursed products, the Best Available Price (BAP) should be used in provinces where a BAP policy is in effect. 	<ul style="list-style-type: none"> - Co-payment has to be accounted for depending upon the perspective of the analysis. 	<ul style="list-style-type: none"> - PMPRB - Individual pharmacies - Drugstores' survey - Private consulting firms

Table 9: Medical Devices, Supplies and Equipment

Cost estimates may be gathered directly from manufacturers or estimated from patients. Retail prices should be used.

Table 10: Out-of-Pocket Costs

These costs encompass the items directly paid out by patients and/or caregivers. Ideally, they should be collected by questionnaire or by a log directly from subjects. An early assessment of the impact that the inclusion of these costs would have on the analysis could be helpful prior to collecting them in detail. If they appear to materially affect the result then they should be included in the analysis.

Table 11: Time Cost (Caregiver Time)

The comprehensive societal perspective suggests that this cost be taken into account. However, controversies exist as to the value to be attached to family or volunteer caregiving. (For example, caregiving may in certain cases provide personal satisfaction and gratification, or, in other cases, may involve time lost by individuals whose time has different opportunity cost and market value. At this time, citing the extent of caregiver time in units of time would seem appropriate). Testing the impact of plausible non-zero values within sensitivity analysis can also be undertaken. Researchers should be aware of the equity issues raised by using different time values for different caregivers.

Table 12: Time Cost (Patient Time)

Sometimes called indirect costs, time costs usually refer to production and productivity losses incurred by the patient, the caregiver, or society as a whole. Arguments exist for the inclusion of these costs in either the cost or benefit side of the cost-effectiveness analysis, or in both, and the issue is not fully settled. Indirect costs incurred by the patient could be estimated directly from the subjects concerned or could be approximated by some average figure. The ethical considerations that underlie any method used should however be kept in mind. In terms of the estimation of the indirect cost to society at large, the Human Capital approach, the Willingness to Pay approach or the Friction Cost method (Koopmanschap, et al., 1995) provide different options.

Table 13: Other Costing Issues

Transfer payments

The inclusion or exclusion of transfer payments should be consistent with the perspective adopted for the study. However, it is currently recommended that transfer payments be excluded from the costing of alternatives in order to remain consistent with the recommendations contained in the Canadian *Guidelines* with respect to the adoption of the societal perspective. When a societal perspective is taken, the inclusion of transfer payments might give rise to double counting.

Non-health care costs

There is current debate as to whether to include non-healthcare costs such as education or police services in health economics costing which takes a societal perspective. Whereas actual studies could include incremental non-health services, this guidance manual is limited to healthcare costing only; however, similar principles apply.

Future health care costs

Future health care costs, costs associated with persons living longer and consuming health care resources, are also the subject of debate. Because of current debate as to the pertinence of their inclusion, these should at the present time be excluded from the analysis.

Overhead costs

Overhead costs need to be accounted for during micro costing.

Capital costs and depreciation

Depreciation need not be accounted for during micro costing unless there are good reasons to believe that its inclusion would make a difference to the outcome of the analysis. Results could be then presented with and without depreciation. (Please note that when health care programmes are evaluated the cost of capital must always be fully reflected, taking into account purchase price and interest costs).

SUGGESTED REPORTING FORMAT

Whatever the method you choose to follow to calculate a dollar value for an intervention or a resource, report the costing method that you have used for each cost category. Costs should be summarized by major category using standard categories and could be reported in the way suggested below.

Intervention under consideration: _____

Comparator intervention: _____

Perspective: _____

Time Horizon: _____

Discount rate: _____

IDENTIFICATION OF RESOURCES

This table below contains the cost categories that are taken into account in the analysis.

CATEGORIES	TREATMENT	COMPARATOR
Inpatient Hospital Care		
Day Surgery		
Outpatient Clinic Visits		
Outpatient Emergency Visits		
Physician/Professional Services		
Home Care		
Long-Term Care		
Laboratory & Radiology		
Medication		
Medical Device Costs		
Out-of-Pocket Costs		
Time Cost (Caregiver Time)		
Time Cost (Patient Time)		

Please differentiate in the table above between:

n.a. not applicable

a.b.n.c. applicable but not considered here

MEASUREMENT OF RESOURCE USE

The table below contains the amounts or quantities used of each category considered. The unit of time or activity in which the resource is measured should be specified.

CATEGORY	TREATMENT	COMPARATOR	RANGE FOR SENSITIVITY
Inpatient Hospital Care			
Day Surgery			
Outpatient Clinic Visits			
Outpatient Emergency Visits			
Physician/Professional Services			
Home Care			
Long-Term Care			
Laboratory & Radiology			
Medication			
Medical Device Costs			
Out-of-Pocket Costs			
Indirect Costs (Caregiver Time)			
Indirect Costs (Patient Time)			

COST VALUATION

The table below contains the values that have been used for each resource unit or cost item measured. The source of the information is also indicated.

RESOURCE UNIT OR COST ITEM	DOLLAR VALUE	SOURCE OF INFORMATION	RANGE FOR SENSITIVITY ANALYSIS

FUNCTIONAL RELATIONSHIPS

Describe the functional relationship between quantities and values that you have used in order to obtain your total cost figures.

REFERENCES

Canadian Coordinating Office for Health Technology Assessment (CCOHTA). 1994. **Guidelines for the Economic Evaluation of Pharmaceuticals: Canada** Ottawa, ON: Canadian Coordinating Office for Health Technology Assessment (CCOHTA).

Jacobs P, Bachynsky J, Hall E. **A Manual of Standard Costs for Pharmacoeconomic Studies in Canada: Feasibility Study.** Ottawa, ON: Canadian Coordinating Office for Health Technology Assessment (CCOHTA); 1995.

Koopmanschap M, Rutten F, van Ineveld BM, van Roijen L.. **The friction cost method for measuring indirect costs of disease.** *Journal of Health Economics* 1995;14:171-189.



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