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**CENTRE FOR HEALTH
PROGRAM EVALUATION**

RESEARCH REPORT 15

**Setting Priorities in South Australian
Community Health III:**

**Regional Applications of Program
Budgeting and Marginal Analysis**

**Diana Edwards
Stuart Peacock
Rob Carter**



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Setting Priorities in South Australian Community Health III

Regional Applications of Program Budgeting and Marginal Analysis

Ms Diana Edwards

Research Fellow, Health Economics Unit, Centre for Health Program Evaluation

Dr Stuart Peacock

Senior Lecturer, Health Economics Unit, Centre for Health Program Evaluation

Mr Rob Carter

Deputy Director, Health Economics Unit, Centre for Health Program Evaluation

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CENTRE PROFILE

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- promote the teaching of health economics and health program evaluation, in order to increase the supply of trained specialists and to improve the level of understanding in the health community.

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The Co-ordinator
Centre for Health Program Evaluation
PO Box 477
West Heidelberg Vic 3081, Australia
Telephone + 61 3 9496 4433/4434 Facsimile + 61 3 9496 4424
E-mail CHPE@BusEco.monash.edu.au

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	PRIORITY SETTING AND PBMA	2
	2.1 Priority Setting in Health Services	2
	2.2 PBMA Methodology	4
	2.3 Regional Programs	5
3	MARGINAL ANALYSIS	6
	3.1 An Options Appraisal Framework	6
	3.2 Dimensions of Benefit in Community Health Services	7
	3.3 Weighting Dimensions	8
	3.4 Identifying Options for Change	13
	3.5 Evaluating/Scoring the Options for Change	15
	3.6 Modelling the Benefit Scores	15
4	RESULTS FROM THE OPTIONS APPRAISAL EXERCISES	17
	4.1 Options Appraisal Exercise Methodology	17
	4.2 Dimensions of Benefit	17
	4.3 Importance Weights for Dimensions of Benefit	33
	4.4 Options for Change	35
	4.5 Evaluating Options for Change	42

5	COST-EFFECTIVENESS RESULTS	44
5.1	Costing Options for Change	44
5.2	Cost-effectiveness of Options for Change	44
6	DISCUSSION: BENEFITS AND COMMUNITY HEALTH	49
7	CONCLUSIONS AND RECOMMENDATIONS	52
	REFERENCES	56
	GLOSSARY	57
	APPENDIX 1 Membership of the Project Steering Committee, the Management Committees and Options Appraisal Panels	59
	APPENDIX 2 Proof of the Multiplicative Weights for Health Model	61
	APPENDIX 3 AQoL Descriptors for Individual Health Gain	62

Setting Priorities in South Australian Community Health III

Regional Applications of Program Budgeting and Marginal Analysis

1 INTRODUCTION

Health service planners in all countries face a common problem: there are insufficient resources to provide all services which may yield potential benefits for the community. Faced with this situation health service planners and decision makers need to decide what services to provide, as well as how, where and for whom to provide those services. Priority setting tools in health economics seek to aid in making these decisions. One priority setting approach is Program Budgeting and Marginal Analysis (PBMA), which offers a pragmatic tool to aid health service planners using the principle of allocative efficiency with particular emphasis on problem solving at the local, regional, and State levels. The focus of PBMA is on practical incremental change to services and programs, rather than the global reform of health service delivery.

The Health Economics Unit at the Centre for Health Program Evaluation was commissioned to advise the South Australian Health Commission on the use of Program Budgeting Marginal Analysis in the Community Health Sector. The Unit was asked to conduct two pilot studies, applying PBMA to priority setting within the Community Health Sector. The first pilot study, which addressed mental health services provided by Community Health in Metropolitan South Australia, is the subject of two earlier reports (Peacock & Edwards 1997; Peacock, Richardson & Carter 1997). This report presents results from the second phase of pilot studies which applied PBMA within four Community Health Regions in Metropolitan South Australia: Adelaide Central Community Health Service (ACCHS), Inner Southern Community Health Service (ISCHS), Northern Metropolitan Community Health Service (NMCHS) and Noarlunga Health Services

(NHS). These four studies examined priorities in different health services within each region. The services were: Women's Health in NMCHS, Aboriginal Health in ISCHS, Men's and Children's Health in ACCHS and Non-intentional Physical Injury to men in the home or at leisure in NHS.

2 PRIORITY SETTING AND PBMA

2.1 Priority Setting in Health Services

To introduce PBMA it is important to first ask the question why do we need to set priorities in health services? The answer to this question stems from what is known as the economic problem: within society there are scarce resources and infinite wants. This problem provides the foundation for the whole of the economics discipline. The economic problem can be rephrased in terms of the health sector to what we might call the 'health economic' problem: society faces a finite level of health resources which are insufficient to meet all the health service needs of individuals within the population. Even if the health sector budget was increased dramatically as a proportion of Gross Domestic Product, we would still face a position where some potential benefits to individuals from health services could not be provided. Under the situation of scarce health service resources for meeting health service needs and providing health related benefits to individuals, health sector planners and decision makers have to address a series of questions:

1. What health services should be provided?
2. For whom to provide those services?
3. How to provide those services?
4. Where such services should be provided?

Priority setting tools in health economics seek to aid health service planners in making these decisions.

In attempting to answer these questions we can start from the basic premise that for a given level of resources, or budget, health services should seek to maximise the welfare of the population they serve. If we seek to maximise the welfare of the population, we then need to consider exactly what is meant by welfare. In the context of health services, welfare is most often considered in terms of the health of individuals, or the sum of the health of individuals which make up a population. More specifically, we can look at the improvements in welfare to individuals and populations in terms of the health gains or health outcomes they obtain from receiving health services.

However, given that we face scarce resources for the provision of health services, consideration of health gains in isolation is not enough to fully answer the above questions. If resources are scarce not all health services can be provided, and by using resources to provide one type of

service we are foregoing the provision of a range of other potential services. That is, providing one particular health service which results in health gains for the population will mean foregoing providing a range of other services, which could also yield health gains for that population. This notion underpins a concept which economists call opportunity cost. The opportunity cost of using a set of resources to provide a particular health service is the benefit which is foregone by not using those resources to provide other health services. In economics this is the only true cost of providing a service: the health gains, or benefits, which could have been achieved by using those resources to provide other types of health services. In terms of planning services we should then be attempting to provide services which yield the most health gains for the dollars spent. Otherwise those dollars could be used to provide other services which offer greater health gains, and would serve to improve the welfare of the population further. Health service planners must, therefore, consider both the health gains which are provided by different services and the costs of providing those services.

Economists refer to the principle of maximising health gains from a given level of health service resources in terms of the concept of allocative efficiency. Allocative efficiency is achieved when the welfare, or health status, of a population is maximised given the resources available. This occurs when the marginal cost of a service is equal to the marginal benefit provided by that service. In other words, allocative efficiency asks the question: if we have an extra health service dollar to spend, what is the best way to spend that dollar so it will maximise health gains.

The notion of allocative efficiency underpins much of the health economics discipline, and is the guiding principle of economic evaluation which is becoming adopted across the world as a method for assessing alternative health service interventions. Economic evaluation is often of limited use to health service planners, however, for two major reasons. Firstly, reliable evidence from economic evaluations is only currently available for a limited number of health service interventions from the vast array of health services which are actually provided. Health service planners routinely have to make decisions about the provision of different health services without the benefit of sound evidence from an economic evaluation. Secondly, economic evaluation is usually limited to comparing resources and health gains for two or three alternative interventions, and generally only for a single condition or health related problem. Health service planners, however, are frequently faced with decisions on a much broader scale. The next question to ask then is: how may we apply the principle of allocative efficiency when we may be considering a whole range of services covering a number of different condition areas, and where evidence on costs and effectiveness is limited? One response to this problem has been the use of PBMA, which offers a pragmatic approach to applying the principle of allocative efficiency (Mooney et al 1992).

2.2 PBMA Methodology

PBMA can be broken down into several discrete steps. The first stage consists of defining the program areas to be studied. The exact choice and nature of the programs to be examined will depend on the organisation, its objectives and existing budget areas. The program structure should be manageable in the sense that program areas are comprehensive but do not overlap, and all services provided should be covered. The program structure for the pilot studies in South Australia was that of client groups with the exception of the injury program for Noarlunga Health Services which used an individual condition area. The resources which are allocated to the individual programs need to be identified and the costs of providing the different services quantified. These costs are then incorporated with the activity information to produce the program budget.

The second stage is to identify those services which may be potential options for contraction or expansion in the future. That is, a range of services are identified which may be considered for change in the future to attempt to improve the overall level of benefits received from services. By identifying only a small number of services to be considered as options for change, the focus is on incremental change to services and not on global reform of health service delivery. In considering services which are options for change, PBMA may be used to examine changes in services within a given program. Three of the South Australian studies took a within-program approach; women's health (NMCHS), Aboriginal health (ISCMS), and injury prevention (NHS). The fourth study, men's and children's health (ACCHS) took a between-program approach.

The third step is to take the identified options for change and evaluate those services in terms of both their effectiveness and cost of service provision. Published evidence on the effectiveness of services can be used, where available, to evaluate the options for change. Where published evidence is unavailable, expert opinion can be used to estimate effectiveness using techniques such as options appraisal and decision analysis. Estimates of effectiveness and costs can then be combined to determine the cost-effectiveness of the services. If the principle of allocative efficiency is being followed, study results will indicate which options are the most and least cost-effective with the implication that resources are better employed in providing the most cost-effective services. The equity implications of any change in the configuration of services can be assessed, and any decisions modified accordingly.

The fourth and final step is to reallocate money according to the cost-effectiveness criteria and equity judgements. The process can then be repeated over a period of time, perhaps a number of years, so that more and more services which are difficult to evaluate are progressively assessed. By sequentially repeating the process, the emphasis of PBMA is to gradually move towards the allocative efficiency goal of maximising health gains for a given level of resources. A fuller description of this process and review of published examples of PBMA studies has been presented elsewhere (Peacock & Edwards 1997).

2.3 Regional Programs

This report presents results from the four regional PBMA studies in South Australian Community Health Services. Each region was responsible for the choice of program(s) to be studied, with advice provided by the HEU at Monash University. The program structures were:

NMCHS	Women's Health Services
ACCHS	Men's and Children's Health Services
ISCHS	Aboriginal Health Services
NHS	Non-intentional Physical Injury to men* at home or at leisure.

* Two target groups were identified:

Men aged 24-45 years who sustained injuries to their eyes and hands at home;

Men aged 16-20 years who sustained a variety of injuries from sporting activities.

The project chosen by NHS was unique in that it attempted to explore transferring resources from acute care to community health to achieve better outcomes for the individual and cost savings for the hospital. Because of this uniqueness, problems were encountered during the project due to difficulties reconciling different funding/resource management systems across the hospital/community health setting.

Each region then constructed its program budget for the studies from local activity and cost information. The costing approach varied slightly between regions and was based on the costing model developed for the first pilot study in mental health (Peacock & Edwards 1997). Results from the program budget phase of these pilots are available from the respective regions. The rest of this report focuses on the marginal analysis phase from the regional studies.

3 MARGINAL ANALYSIS

3.1 An Options Appraisal Framework

Options appraisal, as used in PBMA studies, is based on decision analysis techniques which draw from psychology and economics disciplines. Under the options appraisal approach an expert panel identifies the relevant elements, or dimensions, of benefits from services, assesses the relative importance of each dimension of overall benefit, and evaluates each health service being studied in terms of those dimensions. An overall "score" for benefit is created for each service by combining the scores for each dimension of benefit for the service, adjusted for the relative importance of each part of overall benefit. The options appraisal exercise results in measures of the benefits from a range of services, and attempts to capture the multi-faceted nature of benefits and their importance. These benefits measures then give a guide to the effectiveness of individual services.

The use of expert panels in options appraisal has several advantages. Firstly, when published quantitative effectiveness evidence on services is unavailable, the opinions of panel members are used to provide the estimates of benefits for the services being studied. Secondly, the panel define the elements or dimensions of benefits which are relevant to the context of the PBMA study. As a result, the panel has full ownership over the criteria with which its services are evaluated. Thirdly, the approach is explicit and open for scrutiny, enabling issues to be discussed which may have previously been left unaddressed and implicit in decision making. Finally, the expert panel can make direct use of qualitative evidence in the definition of benefits, the importance of the different elements of benefits and in the evaluation of services. In this way, qualitative evidence can be included, where available, as a meaningful aid in the decision making process for setting priorities.

The approach adopted for the pilot studies in South Australia extends the techniques applied in the use of the expert panel beyond that previously reported, and represents the most rigorous use to date of expert judgement in the application of PBMA to priority setting in health care. The framework adopted involves several key elements which are as follows:

- (i) The expert panel for the options appraisal exercise should consist of members of the management committee for the project, and an additional group of key stakeholders, including representatives from the community, service providers from the different regions and primary health care agencies. This panel should represent a wide range of key interests in estimating the benefits associated with different options for changes in services.
- (ii) The expert panel should receive significant education and training in the principles of priority setting and decision analysis. This is a necessary pre-requisite if the panel is to have ownership of the process and the results of the study. The panel should also be asked to complete hypothetical exercises, prior to the actual exercise, to enable more meaningful discussion to take place.

-
- (iii) The panel should identify services which are to be evaluated, both in terms of services which may be introduced/expanded or withdrawn/contracted in the future.
 - (iv) The panel should define the dimensions of benefit which are relevant to the organisational context and the objectives of the organisation. They should also describe the different levels of benefits under each different dimension of benefit, to ensure that there is common understanding of the nature of each dimension of benefit.
 - (v) The expert panel should assess the relative importance of each dimension of benefit, as dimensions are unlikely to be of equal importance.
 - (vi) Each service, identified above, should be evaluated under each dimension of benefit, and "scored" according to the panel's expert judgment.
 - (vii) The panel's scores for each service under each dimension of benefit should be combined in a model which accounts for relative importance of each dimension. The panel should be able to return to parts of the exercise for validation if they feel a combined score is not plausible for a given service.

3.2 Dimensions of Benefit in Community Health Services

The first step in the options appraisal exercise is to define precisely what is meant by benefit in the context of the study. This is not a trivial task, as benefits from health services may be diverse and complex, and as a result are frequently difficult to define. This often results in a lack of clear, and shared, understanding of the outcomes from different health services. The options appraisal exercise attempts to define the range of benefits from health services, by eliciting different dimensions or elements of benefits, which the expert group perceive as making up the overall benefits from the services provided. This approach raises two key issues: that dimensions of benefit identified by the expert group are specific to the context of the study, and that the dimensions of benefit must be mutually exclusive.

Firstly, dimensions of benefit identified by the expert group are specific to the context of the study. The elements of benefit identified in the pilot studies relate to the perceived benefits of the different health services provided within the Community Health sector in metropolitan South Australia. Such dimensions may not be appropriate for other types of services in Community Health, for health service areas other than Community Health, or for health services outside of South Australia. Hence, generalisation of study results must be done with caution. The specificity of the context in the options appraisal exercise reflects the underlying aim of PBMA to be a tool for aiding decision making for specific problems.

Secondly, the dimensions should be mutually exclusive (or orthogonal) and collectively exhaustive. Orthogonality means that each dimension of benefit should be separate and distinct from the other dimensions of benefit identified. If the dimensions of benefit are not orthogonal, then different dimensions will capture some of the same elements of overall benefits as other dimensions. This leads to a problem of double counting resulting in the overall benefit from the

service being overestimated. If dimensions of benefit are not collectively exhaustive the reverse holds, as some elements of benefits may not be captured leading to underestimation of overall benefit from services.

Having identified the dimensions of benefit, the expert panel is then asked to determine the appropriate descriptors for these dimensions of benefit. This process involves describing the best and worst levels, or states, for each dimension of benefit and a range of intermediate levels or states. Since the options appraisal exercise asks the panel to rate services in terms of these different dimensions, it is vital that each member have a clear understanding what benefits each dimension is intended to capture. Moreover, not only should each panel member have a clear understanding of dimensions and their description of benefits, it is crucial that members have the same, shared understanding. To achieve this it is important that the description of each type of benefit be more than just a one line broad statement about that dimension of benefit.

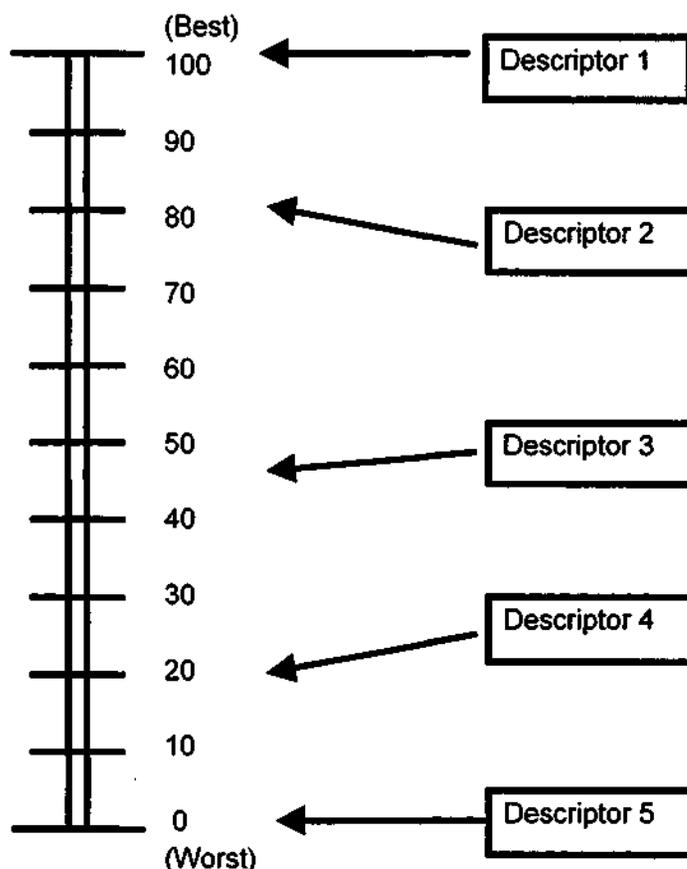
The process is started by the panel defining the best and worst state for each dimension of benefit, and then placing these at the endpoints of a rating scale (0 is worst, 100 is best). Having defined the endpoints of the scale, the panel is then asked to decide upon the descriptors which lie somewhere in between the best and worst states. Each member of the panel is asked to place these intermediate descriptors on the rating scale, between 0 and 100. Each panel member's responses are collected, and the average value for the descriptors of each dimension calculated. This gives a calibrated scale from 0 to 100 for each dimension, with descriptor states at different intervals on the scale. The positioning of each descriptor on the scale reflects the groups average values. The end result is a calibrated scale for assessing services under each dimension, which should maintain the interval property required for rating scales. Moreover, through the process of constructing the descriptors, the panel raises the level of shared understanding about the meaning and nature of different dimensions of benefit. This exercise is illustrated in Figure 1.

3.3 Weighting Dimensions

The next stage is to assess the relative importance of each dimension of benefit. It is unlikely that all dimensions of benefit will have the same importance or significance. If there are differences in the relative importance of dimensions of benefits, the dimensions should be weighted, or adjusted, to reflect those differences. Whilst the PBMA literature has recognised the need for weighting dimensions, expert panels in some studies have failed to reach agreement on an appropriate set of weights. These weights are crucial if the scores for services evaluated under each dimension of benefit are to be combined in a meaningful way. If the relative importance of dimensions do differ, and the panel cannot reach a decision about the size of the weights, there will be a serious shortcoming in the study results. The reason for this is that combining the score for benefits without weighting those scores implicitly gives each dimension equal importance (a weight of one). Therefore, whilst a panel may feel unclear at the outset about the relative importance of each dimension, failure to reach agreement on their relative importance leads to a clear, but implicit, statement that all dimensions are equally important. To attempt to avoid this problem the importance of weighting the dimensions of benefits was

outlined at the workshops prior to the options appraisal exercise, in the preliminary exercise, and at the exercise itself.

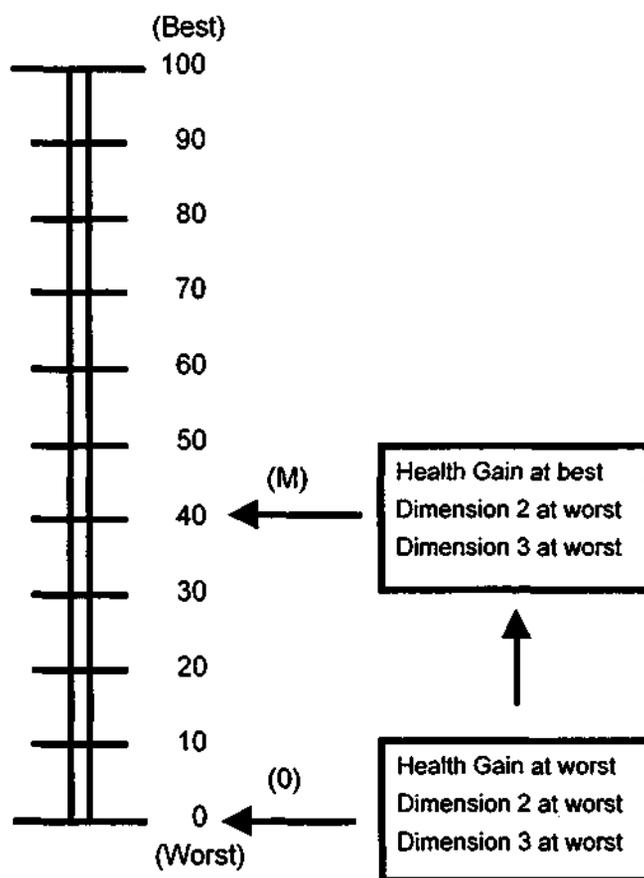
Figure 1: Descriptors for Dimensions of Benefits



The methodology used to assess the relative importance of each dimension again uses a rating scale. Two approaches are used in this exercise. The first method, the bottom up method, uses a starting point of all dimensions of benefit at their worst level and assesses the importance each panel member places on movements from the worst to the best state of different dimensions of benefit. The second method, the top down method, uses a starting point of all dimensions of benefit at their best level, and assesses the importance each panel member places on movements from the best to the worst state of different dimensions of benefit. Each panel member is asked to complete the exercise for both approaches, and their average values for the difference between best and worst states under different dimensions of benefit are calculated. The reason for using two approaches is that individual's valuations of the difference between the best and worst states may depend on the reference point which the individual starts at. This is due to framing effects, a concept which put simply, states that how you ask a question may influence the answer you get. Averaging the values from the bottom up and the top down methods is therefore an attempt to reduce the impact of potential framing effects.

The bottom up method for eliciting dimension weights is shown in Figures 2 and 3. The first important issue to note is that this method makes use of valuing the importance of dimensions of benefit relative to the dimension of benefit of health gains to the individual receiving a health service. That is, individual health gain was predetermined, before the options appraisal exercise began, as one of the dimensions of benefit obtained from Community Health services. The decision to ensure that individual health gain was included as a dimension of benefit in the study was taken by the Steering Committee for the PBMA pilot studies, on recommendation by the Health Economics Unit. The rationale for this decision was that the fundamental aim of all health services is to provide health improvements for individuals, and that evaluation of all health services should include assessment of how effective those services are in providing improvements in health for individuals.

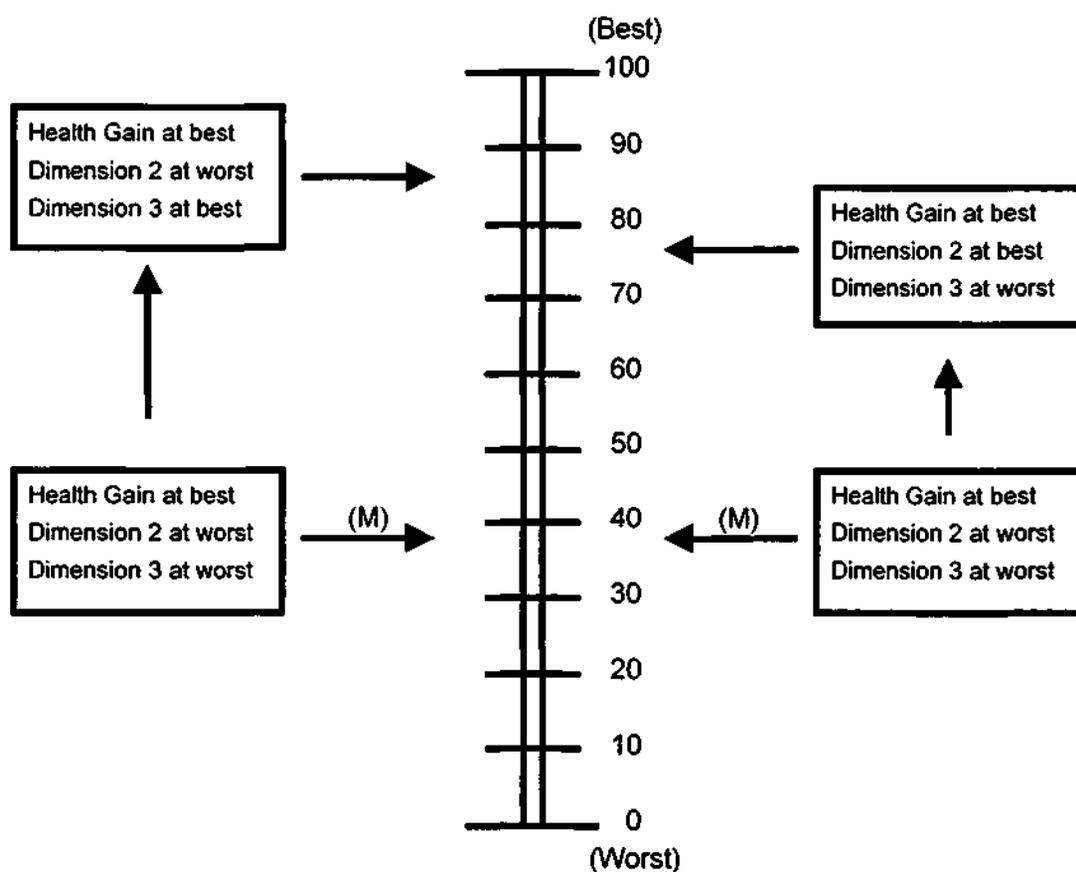
Figure 2: Weighting Dimensions - Bottom up Method for Individual Health



The bottom up method first asks panel members to assess the value of a move from worst to best possible health state for an individual, with all other possible dimensions of benefit at their worst level. This corresponds to asking the panel members how far they would move up the rating scale from the point 0, where all dimensions (including individual health gain) are at their worst level, to a point M, where individual health is at its best level, but all other dimensions

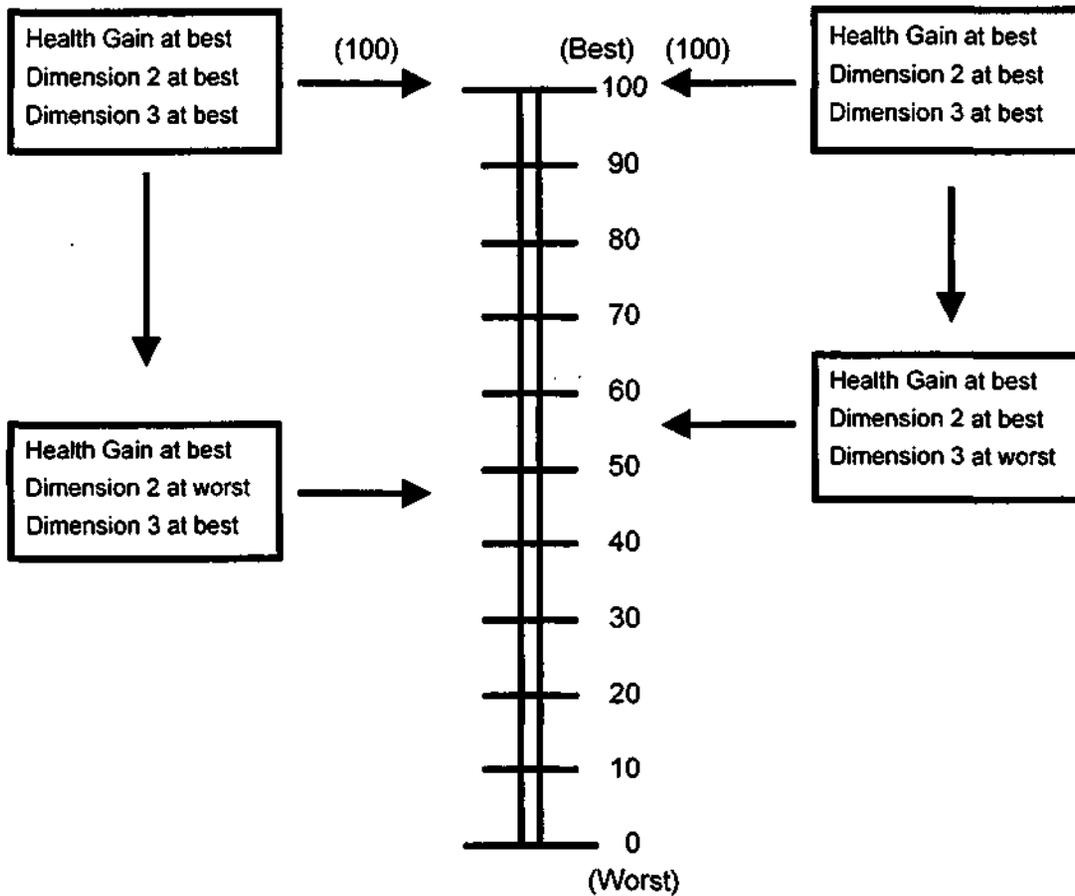
remain at their worst level. Figure 2 shows this movement for two other possible dimensions for simplicity. Having determined the value M, each individual panel member then uses this point as the reference point for the rest of this part of the weighting exercise, as shown in figure 3. Each panel member is asked to assess, in turn, the position on the scale for each of the other dimensions of benefit when it is at its best level, with individual health also at its best level, whilst all other dimensions remain at their worst level. That is, for each dimension in isolation, panel members are asked how much they would value a movement in that dimension from its worst to its best level, with individual health always at its best level and all other dimensions at their worst level.

Figure 3: Weighting Dimensions - Bottom up Method for all Other Dimensions



The top down method for eliciting dimension weights is shown in Figure 4. This method uses the top point of the scale as the reference point, where all dimensions are at their best level. Panel members are then asked, for each dimension in turn, how much value would they place on avoiding a move from a dimension's best to worst level, with all other dimensions held at their best levels. Note, the importance scores derived from these methods do not sum to 100, it is the relative size of each weight (the ratio of one weight to the others) which is determined by this process.

Figure 4: Weighting Dimensions - Top Down Method



From these two methods the basis of the weights for the different dimensions of benefit are found. The bottom up methods yields the single value M , which forms the basis of the weight for the relative importance of individual health gain. The bottom up and the top down methods yield two sets of importance values for each of the other dimensions of benefit. The average value for each panel member is then found to adjust for the potential impact of any framing effects. The individual panel member's average values for the other dimensions, and their values for M , are then used to construct the group average set of relative importance values. This average is then used to construct the importance weights. The two sets of information generated can be written as:

M = Group average for the maximum value of individual health when individual health is at its best level, and all other dimensions of benefit are at their worst levels.

W_i = Group average of the importance values for dimension i , where there are $i = 1, \dots, n$ other dimensions of benefits (the 'raw' importance weights).

To construct a final combined benefit score for the services to be evaluated, the raw importance weights for all dimensions are re-scaled by a factor k , where:

$$k \sum W_i = 100 - M$$

so

$$k = (100 - M) / \sum W_i$$

and

$$w_i = k W_i / M$$

where w_i are the weights for each of the $i = 1, \dots, n$ other dimensions of benefit to be used in the model to calculate combined benefit scores for each service.

3.4 Identifying Options for Change

Some published PBMA studies have reported significant difficulties in generating the options for changes to services to be evaluated. Primarily, some expert panels have found it difficult to, or have been unwilling to, identify services which they might consider for contraction in the future. In some cases this has led to the marginal analysis exercise failing completely, and the study has not been able to assess priorities (Street, Posnett and Davis, 1995).

The approach adopted for this study focused on the education of the panel members, outlining that failure to identify options for contraction will mean that the available resources for Community Health are unlikely to be employed in the best way to serve the community. Considerable time was spent on the notions of opportunity cost and allocative efficiency to reinforce the need to be open about identifying and evaluating options for change. The study was aided in this process by reinforcing the pilot nature of the study: that the results would not be directly implemented, but instead would inform the development of a long term strategic planning approach.

In addition to the education and training of the panels, the pilot study management committees were also asked to answer several questions, in a preliminary exercise, addressing services which may be potential options for change in the future. The aim of this preliminary exercise was to stimulate thought and discussion before the full options appraisal. Two approaches to identify options for change were used in order that the choice was as comprehensive as possible. This also had the advantage of attempting to adjust for any potential framing effects in the way in which the committees were asked to identify options for change.

The questions in the preliminary exercise were:

Part 1

- (a) Of the services provided in your program budget, identify those services which you feel gave relatively low benefits to clients, when compared to other services provided in the program budget.

-
- (b) Of the services provided in your program budget, identify those services which you feel gave relatively high benefit to clients, when compared to other services provided in the program budget. Also identify services which were not provided which you feel would give relatively high benefits, when compared to other services in the program budget.

It was pointed out that judgements on the relative merits of services provided in the program budget would have to be made in order to answer the questions. The following questions were given to the Management Committees to aid in this process.

For existing services:

- Is there an ongoing need for the service in your community?
- Is the service effective in meeting that need (and is there any evidence to support the claim that the service is effective)?
- Do other agencies provide the same or equivalent services - if so, which agency is the "most appropriate" to provide that service? That is, would that service fit into the underlying principles and values of Community Health (for example, as laid down by the Ottawa Charter), or would it be more closely aligned with the approaches adopted by other agencies?
- Is the service being provided primarily because other agencies do not provide that service, or otherwise the service does not really fit the underlying principles and values of Community Health?

For services which are not currently provided:

- Are there needs in the community not currently being met which Community Health should (given their underlying principles and values) be meeting?

What services would meet this need effectively (and is there any evidence to support that the service is effective)?

Part 2

- (a) If you were facing a 10 per cent budget reduction for your program, which services that are currently being provided would you choose to no longer provide? You may choose to no longer provide some services or to scale down some existing services.
- (b) If you were facing a 10 per cent budget increase for your program, which services that are currently provided would you now choose to provide? You may choose to provide a range of new services or to expand some existing services.

3.5 Evaluating/Scoring the Options for Change

The services identified as options for change are then evaluated by the panel. To assess how well a service performs under each dimension of benefit, the panel uses the rating scale as described previously with 0 (worst) and 100 (best). The descriptors for each dimension are placed on the scale, using the group average position on the rating scale, to provide a guide for panel members in determining the position of the service in question on the scale. Panel members are not confined to choosing one of these descriptors as the relevant point on the scale to place a service, instead the descriptors are markers to aid panel members in evaluating services. Previous PBMA studies have used rating scales, but have not added descriptions to the scales. This approach may lead to rather arbitrary scores for services under different dimensions, and may invalidate the interval property of the rating scale.

This exercise results in scores for all dimensions of benefit for each service. These scores can be written as:

- H = the score for individual health gain, on a 0-100 scale.
D_i = the score for dimension i on a 0-100 scale, where there are i = 1,...,n other dimensions.

3.6 Modelling the Benefit Scores

Prior to the options appraisal exercise in the Mental Health pilot, two models for combining benefit scores were presented to the PBMA project steering committee. The first model was the simple additive model given by:

$$B = w_H H + w_1 D_1 + \dots + w_n D_n$$

Where B is the combined benefit score; w_H is the weight on individual health gain; and w_1, \dots, w_n are the weights on the other 1, ..., n dimensions of benefit.

Under this model the combined benefit score, for a given service, is the sum of the scores for each dimension of benefit weighted for the relative importance of each dimension. Whilst this model is conceptually very simple, easy to understand and easy to compute, it has a major disadvantage. It is possible that a given service may score very poorly (or even zero) for individual health gain, but still have a high value of B due to high scores on other dimensions. For example, if equity is another dimension of benefit and a service scores highly on equity but zero on individual health gain we may get a high combined benefit score B. That is, the model may suggest that service performs well under our criteria and should be expanded in the future, when in fact the service is merely equitable in the way it is ineffective in providing health gains for individuals. Given the underlying principle of providing health care to yield health improvements for individuals, this property of the model may be highly undesirable.

To attempt to counter this undesirable property a second model was proposed using multiplicative weights for health for each service examined. The model is given by:

$$B = [1 + w_1d_1 + \dots + w_nd_n]B_H$$

Where

d_i = the score for dimension i on a 0-1 scale (ie $D_i/100$) (for a given service)

B_H = the score placed on individual health gain (for a given service)

This model has the property that if individual health gain is zero, the combined benefit score B also goes to zero. Hence, positive combined benefit for services can only occur if the service yields some improvement in the health of an individual using that service. Individual health gain in this model is then weighted by the importance of, and scores for, each of the other dimensions of benefit when a service is evaluated. The term B_H , the benefit score for individual health gain, is given by:

$$B_H = hM$$

where

h = the score for individual health gain on a 0-1 scale (ie, $H/100$) (for a given service)

M = Group average for the maximum value of individual health when health is at its best level, and all other dimensions of benefit are at their worst levels.

This model can be expanded to be used directly with the data elicited from the expert panel responses. The panel will determine the relative importance of each dimension, as shown in section 3.2, yielding the values M and W_i for the $i = 1, \dots, n$ other dimensions of benefit. Then the panel will determine the scores for each service to be evaluated over each dimension, H and D_i , for $i = 1, \dots, n$. These data can be placed directly into the formula:

$$B = \frac{H}{100} \left[M + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_1 D_1}{100} + \dots + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_n D_n}{100} \right]$$

to derive the combined benefit score of the service (proof of the derivation of this equation is given in appendix 2). This utility measure has a 0 to 100 scale, with zero representing the worst possible benefit score, and 100 the best possible benefit score.

The PBMA project steering committee decided to adopt the second model for the purposes of the options appraisal exercise. The reasons for adopting this approach were again explained to, and agreed by, each of the management committees involved in the separate pilot studies for NHS, ACCHS, NMCHS and ISCHS.

4 RESULTS FROM THE OPTIONS APPRAISAL EXERCISES

4.1 Options Appraisal Exercise Methodology

The options appraisal exercise for each individual Community Health Service was set up to take place over a period of two and a half days. This was a decision made by the Steering Committee in view of comments received after the evaluation of the mental health services pilot. The opinion was expressed that the options appraisal exercise was difficult and demanding, and would be more easily handled with breaks between sessions.

Invitations to participate as members of the expert panels were extended to the pilot study Management Committee for each Community Health Service, whose members included service providers, managers, finance officers, and systems controllers in Community Health, as well as representatives of the community and the South Australian Health Commission Purchasing Office. This representation sought to ensure that a wide range of values, opinions, and expert knowledge would be made available in undertaking the exercise.

Prior to the options appraisal exercise, two workshops were held. The first was for the Chief Executive Officers of the four regions involved in the study, and the second for the Management Committees and the expert panels. The aim of these workshops was to introduce the concept of PBMA in general, and more particularly, to explain the methods to be used in the options appraisal exercise. For some of the participants, the ground covered was not new as they had been involved in similar workshops for the mental health pilot study, but the opportunity to review the principles involved was found useful. Shortly before the first options appraisal exercise, all participants involved were also asked to carry out a short exercise involving the purchase of a new car. This exercise introduced the concepts of benefits, the descriptions of those benefits, and the importance attached to them in the context of an everyday application. The participants were also asked to spend some time, before the first options appraisal session, thinking about the benefits that clients receive from the services that they were providing, and to write a short paragraph listing those benefits.

Since each regional Community Health Service was considering a set of different health services in the second pilot, four individual options appraisal exercises were carried out with the expert panels selected from each region. The members of the expert panels are given in Appendix 2. These exercises were facilitated by Stuart Peacock, Diana Edwards and Rob Carter from the Health Economics Unit at Monash University.

4.2 Dimensions of Benefit

The first day of each options appraisal exercise was spent identifying and describing the dimensions of benefit. The identification process was equally as challenging as in the Mental Health pilot and often resulted in lengthy clarification of values underpinning services. This was not unexpected given the multi-faceted nature of benefits from Community Health Services.

Each expert panel was led through the same process of identifying needs/unmet needs, process benefits, output benefits and outcomes associated with their services. This approach was adopted by the Health Economics Unit as it provided a step-by step approach for participants to be fully involved, not only in the actual process, but also in the recognition and understanding of the value-base upon which benefits were derived. By adopting the same approach in each pilot, a "common language" emerged which related to the theory of priority setting. The process took the form of a general discussion, led by the facilitators, which was without exception lengthy and at times difficult. The result was that each expert group agreed to work with the dimensions of benefit which were, as in the first pilot, individual health gain, community health gain and equity.

The consensus opinion from the regions, after the exercises were completed, was that this part of the options appraisal exercise was worthwhile in its own right, as it led to clarification of the values underpinning services and benefits derived from those services. Panel members were unanimous in their opinion that the explicitness and openness of the process was one of its major strengths and led to a shared set of values being made explicit across their organisation. Other comments were that the process was "enlightening" and led to new ways of thinking and a higher awareness of activities and personal values.

The task of defining the descriptors for the dimension of benefit of individual health gain for the four different regions was approached in a different way to that of the Mental Health pilot. Each panel was presented with three alternatives which were: to use the five different health states generated from The Assessment of Quality of Life (AQoL) Instrument (see Appendix 3), to adopt the descriptor for individual health gain from the mental health pilot, or to formulate their own. The AQoL was described to the panels as a validated and psychometrically calibrated instrument for the evaluation of a range of health interventions. The health states were constructed such that they fulfilled three criteria:

1. That they represent different health conditions, spanning a wide variety of health states.
2. They covered the AQoL *all best* - represented by a utility value of "1.00" - and *all worst* - represented by the utility value "-0.21" health states: and
3. They represented, approximately, equal-interval utilities within the range between all best and all worst. This is shown in the Table 1.

Table 1 AQoL Health State Utility Values

Health States	AQoL-Utility
Health state 1	1.00
Health state 2	0.75
Health state 3	0.46
Health state 4	0.21
Health state 5	-0.21

The panel was then asked to consider whether the descriptions of these health states were appropriate for individual health gain.

The result was unanimous in that the four panels individually rejected the AqoL as being a "medical model" which appeared to focus on the illness end of the health spectrum. As such, it was thought that a medical model is incapable of representing the types of benefits which Community Health Services provide, as the value-base underpinning these services is fundamentally different to that underpinning medical services. In particular, panel members from the pilots on Men's/Children's Health, Women's Health and Aboriginal Health all noted that spirituality had been omitted from the individual health state descriptions in the AqoL. This fact was seen as a serious limiting factor for its acceptance as a guide to describing benefits from their services.

Other reasons for rejecting the AqoL varied. In the case of NMCHS, rejection was based on the perception that the AqoL didn't focus on "well-being". One panel member considered it unsuitable to describe the benefits from women's health services, as these benefits could often be described as being more "emotional" in nature, particularly when considering counselling services dealing with domestic violence and sexual abuse. Because of this, and its focus on the taking/not taking of medication, it didn't "capture the fact that people might not need medication, but might still be at risk of killing themselves". The panel from ISCHS which was examining Aboriginal Health also commented that the AqoL appeared to be based "on the needs of old people". Further comments pointed out that Aboriginal people could be "perfectly healthy" in the sense that they were not taking medication, but might have no friends or warm, close relationships. This would make them "unhealthy" in their understanding of the concept of health. Consequently, the AqoL was seen as insensitive to measuring health gains in these circumstances.

With the rejection of the AqoL, the individual panels were then presented with the descriptors from the Mental Health pilot and asked whether they would either accept these or use them as a guide to formulating their own descriptors (Peacock, Richardson, Carter 1997). Each region

accepted the latter proposal. Despite having these descriptors as a guide, there was considerable discussion amongst panel members in each region before the descriptors for their individual projects were finalised. In this respect, the process was easier in the individual pilot studies than in the mental health pilot, as in the latter there was no example to use as a guide, and all descriptors had to be formulated from scratch. For the dimensions of benefit of community health gain and equity the alternative choice was to adopt the descriptors from the mental health pilot or once again to formulate their own. In both cases, the latter proposal was chosen.

The decision to reject the AQoL, and to use the descriptors from the Mental Health pilot as a guide, was an independent one made by the panel members in each of the four individual pilots. The facilitators from Monash University wished to avoid any bias in the decision to reject/accept the AQoL. Consequently, each group was unaware of the decision made by other groups when considering their own project.

With the exception of Noarlunga Health Services which studied Injuries at Home/Leisure within a target group of males (24-45 years injured at home, 16-20 years injured in sporting activities) and Inner Southern Community Health Service (Aboriginal Health), the descriptors for individual health gain were broadly similar. All regions focussed on individual independence, a sense of well-being, social acceptance and belonging, a necessary skill base and the ability to respond to life's challenges as pre-requisites for the best possible level of individual health gain. Northern Metropolitan Community Health Service (Women's Health) qualified their description of well-being to include the spiritual, cultural, psychological or social spheres as a source of meaning/purpose for the individual.

In the case of Aboriginal Health, the most pertinent difference in the descriptors for individual health gain was the inclusion of a sense of "family well-being, spiritual and cultural acceptance". This theme was reiterated in the intermediate health states where lack of family and/or community support contributed to the health state having a lower level of utility. The other inclusions which were strikingly different were "feelings of shame", "racism" and "denial about their situation".

Due to the more medically oriented nature of the home and leisure based injury study within Noarlunga Health Services the descriptors for individual health gain concentrated on physical attributes such as being "pain-free, mobile and needing no aids". Included was also the "knowledge of and being active in injury prevention".

The dimensions of benefit and the corresponding descriptors for each region are presented in Figures 5 to 16.

Figure 5: ACCHS Individual Health Gain

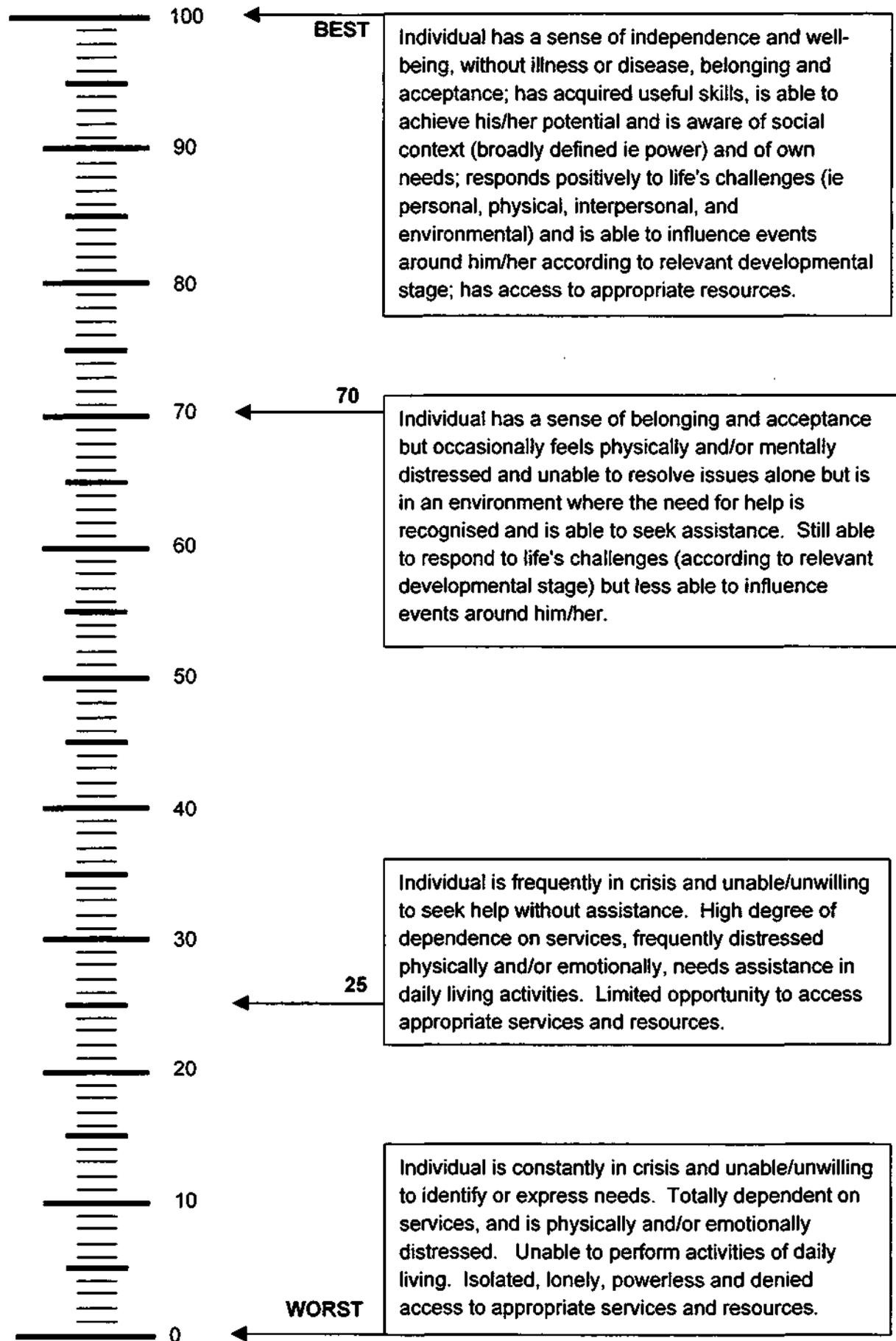


Figure 6: ACCHS Community Health Gain

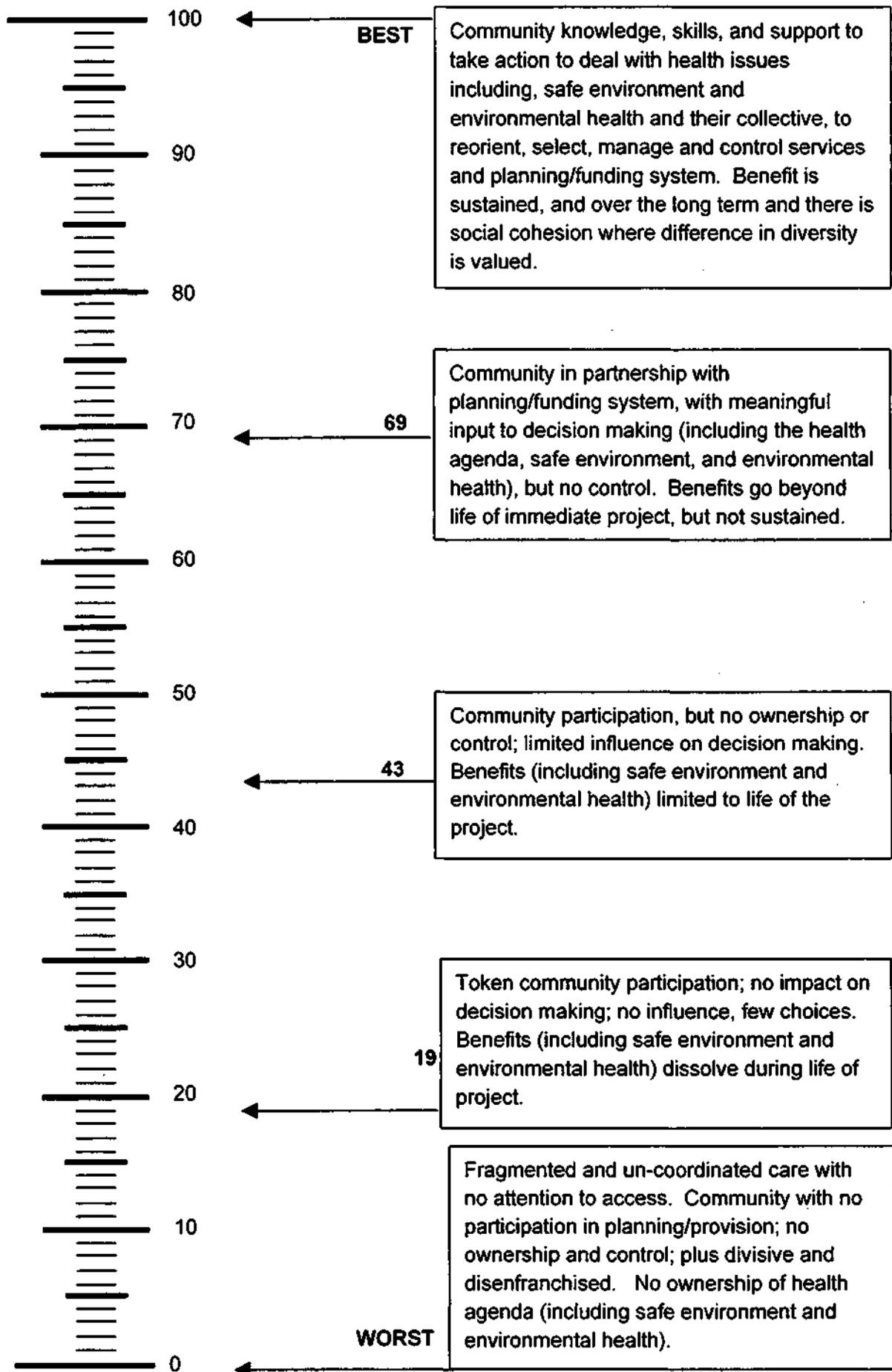


Figure 7: ACCHS Equity

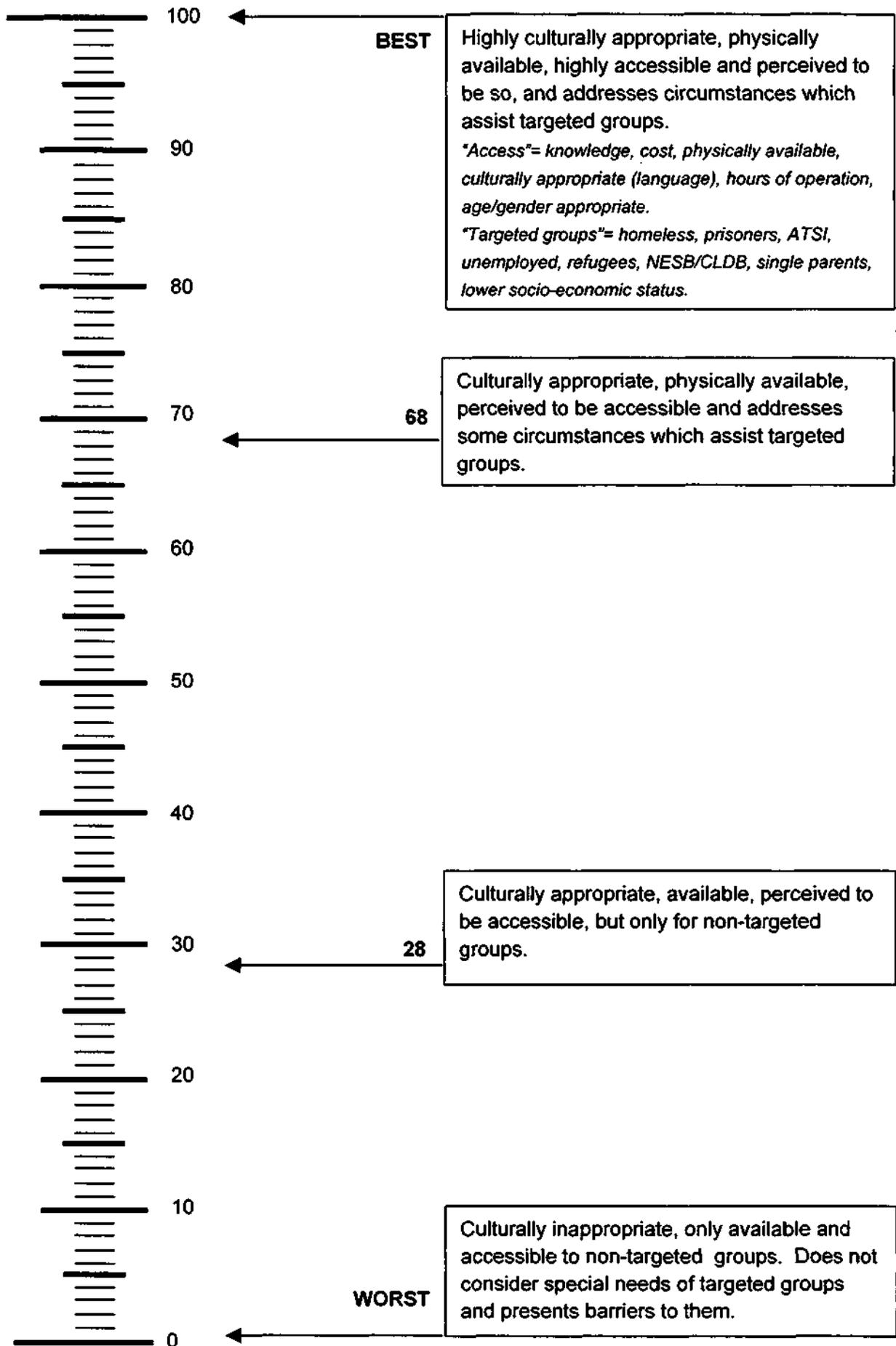


Figure 8: NMCHS Individual Health Gain

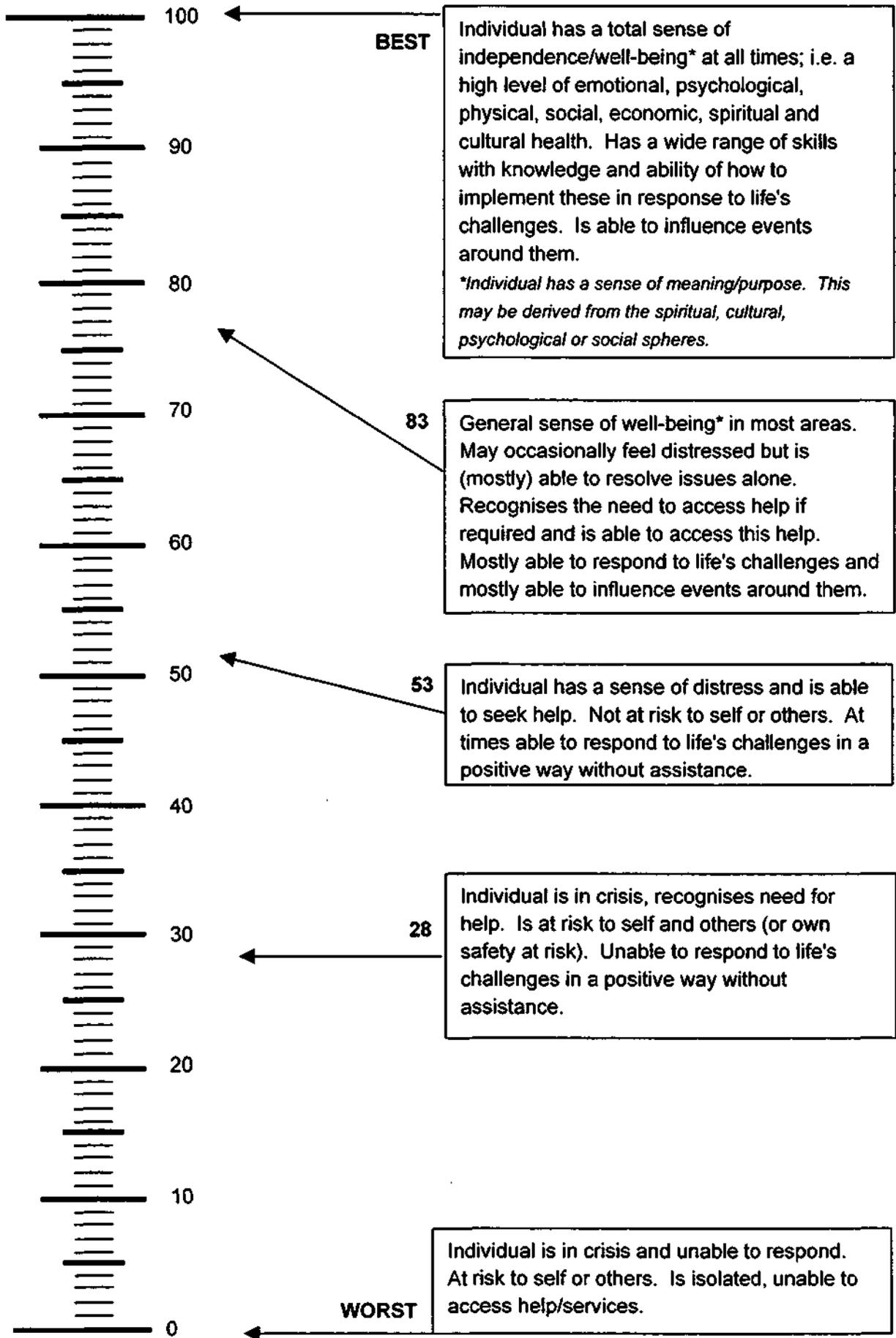


Figure 9: NMCHS Community Health Gain

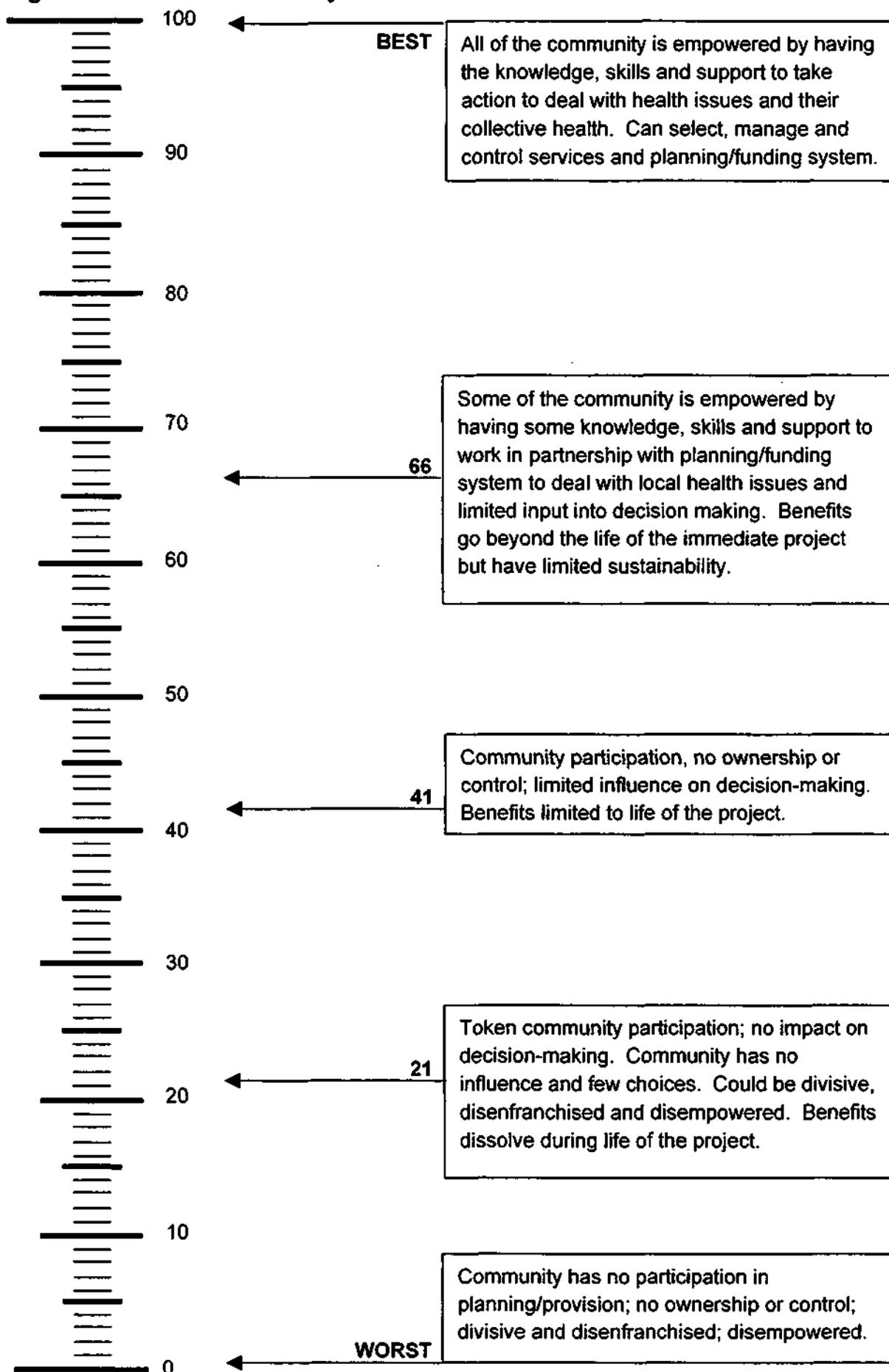


Figure 10: NMCHS Equity

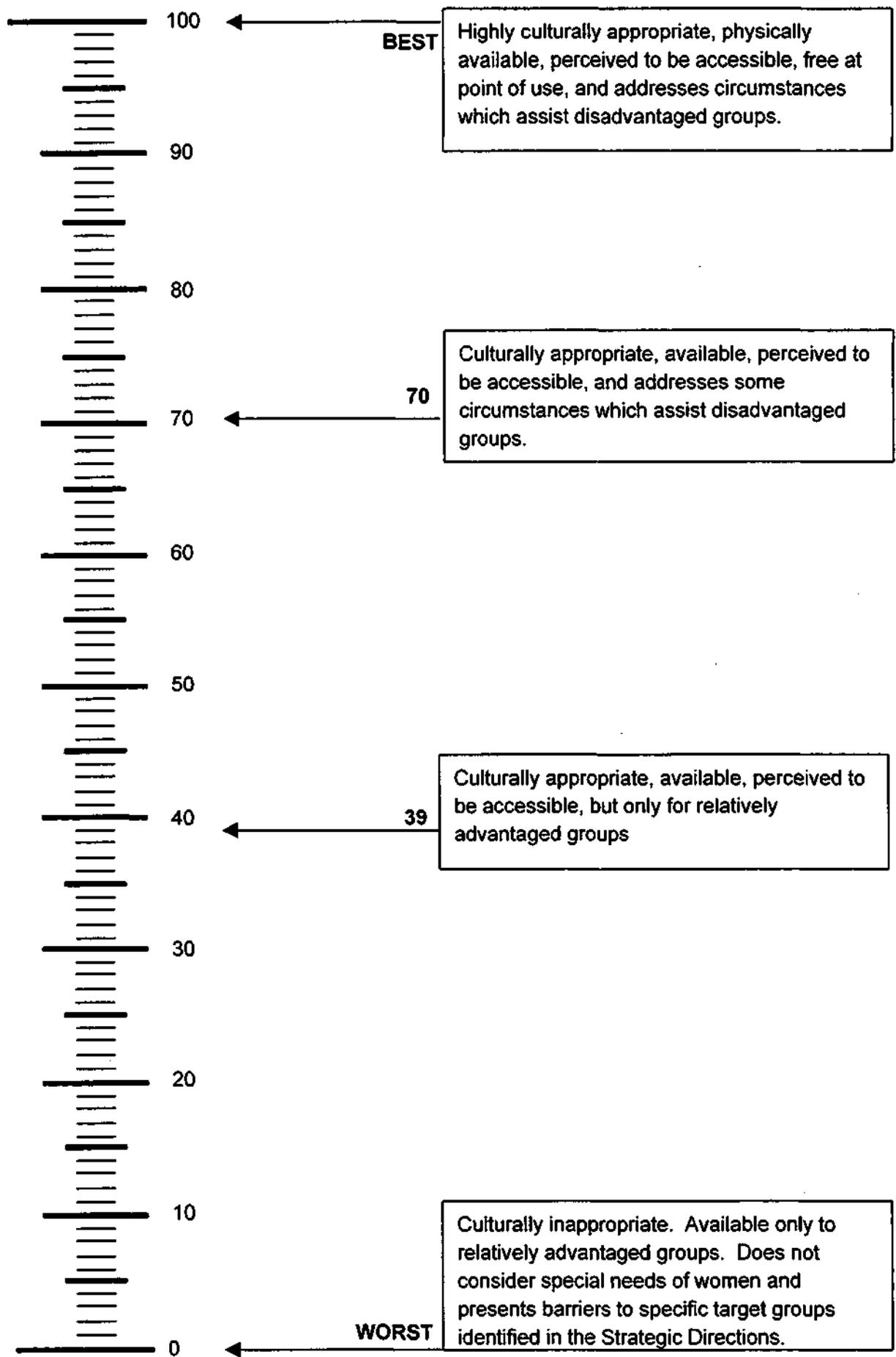


Figure 11: NHS Individual Health Gain

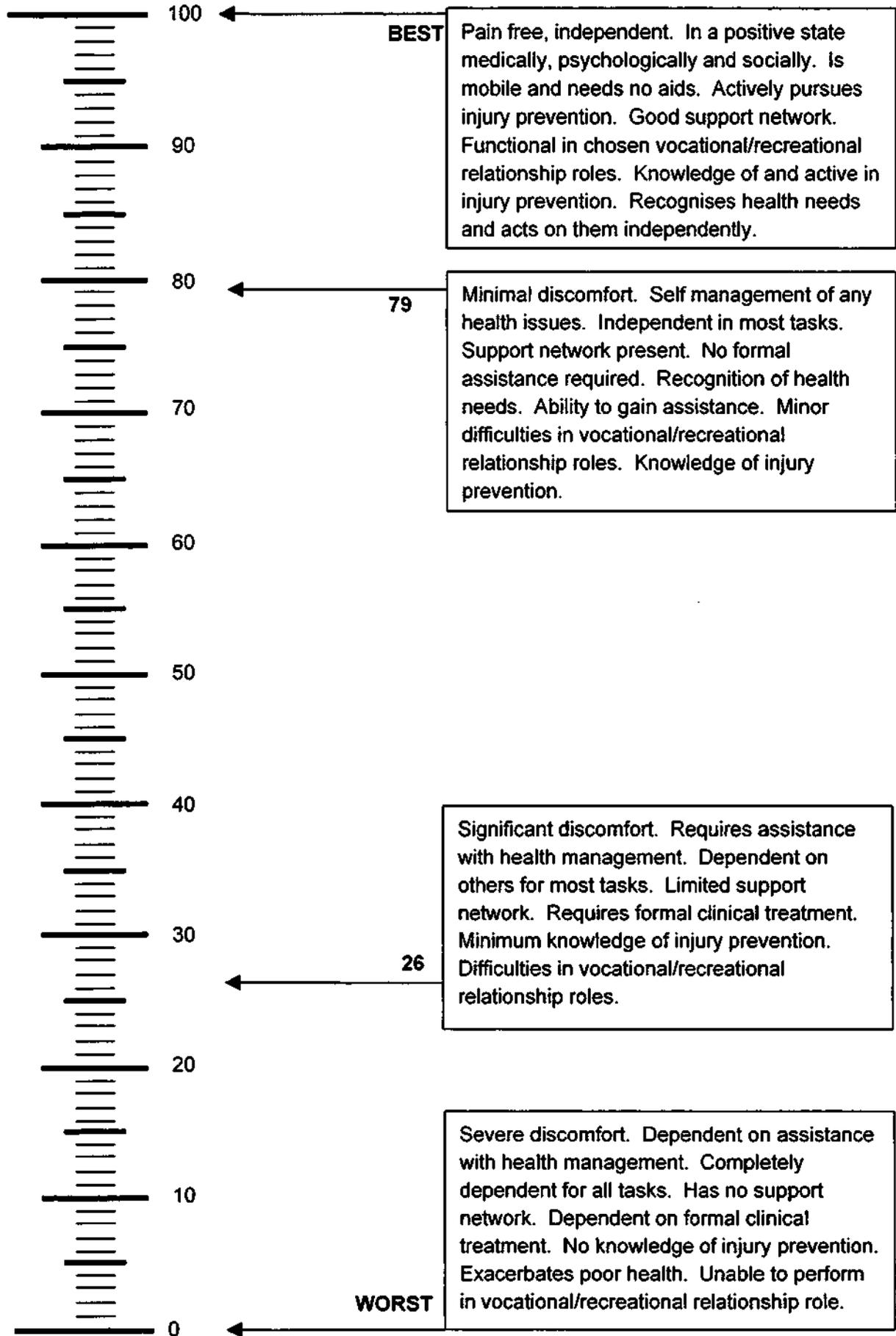


Figure 12: NHS Community Health Gain

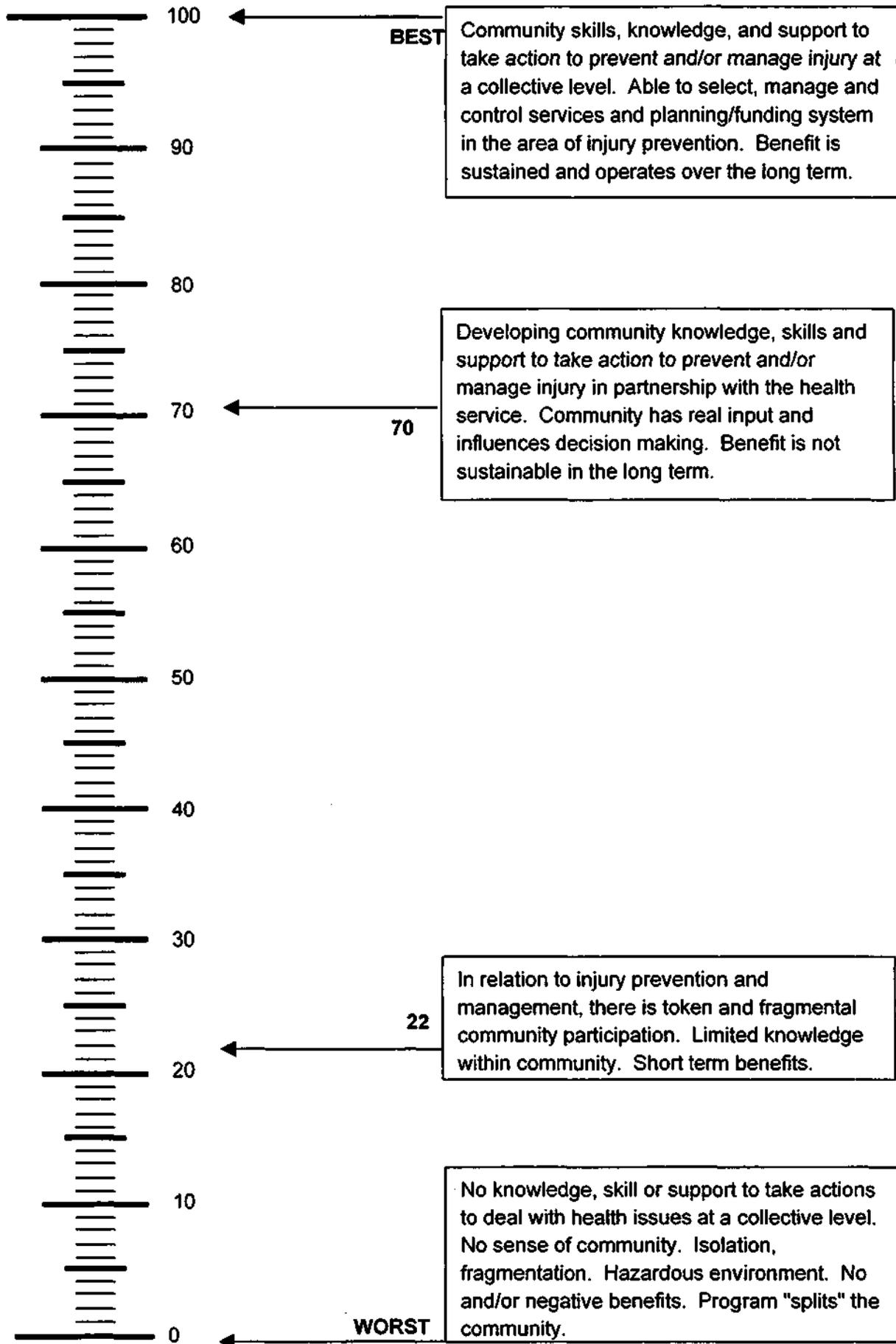


Figure 13: NHS Equity

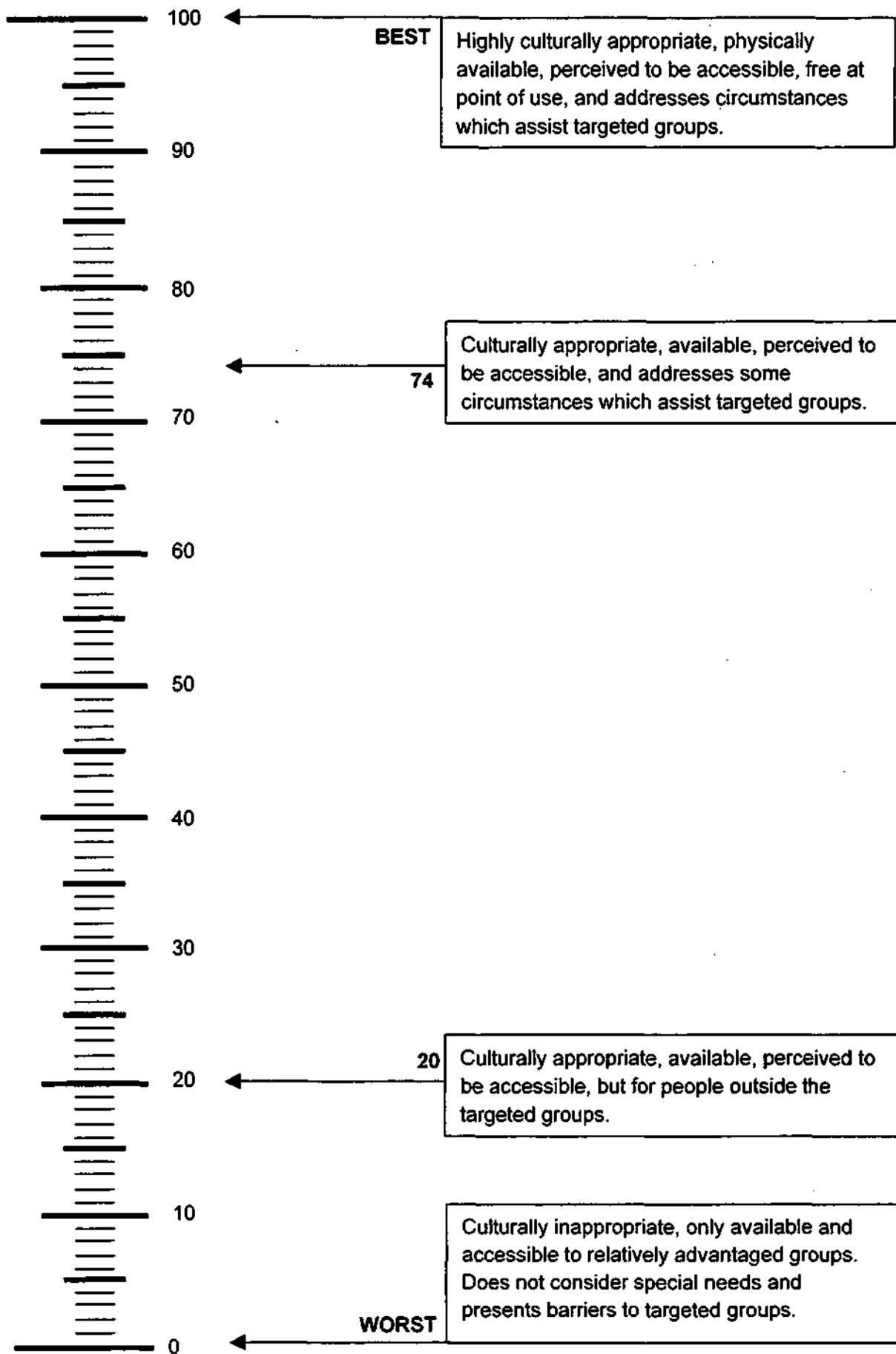


Figure 14: ISCHS Individual Health Gain

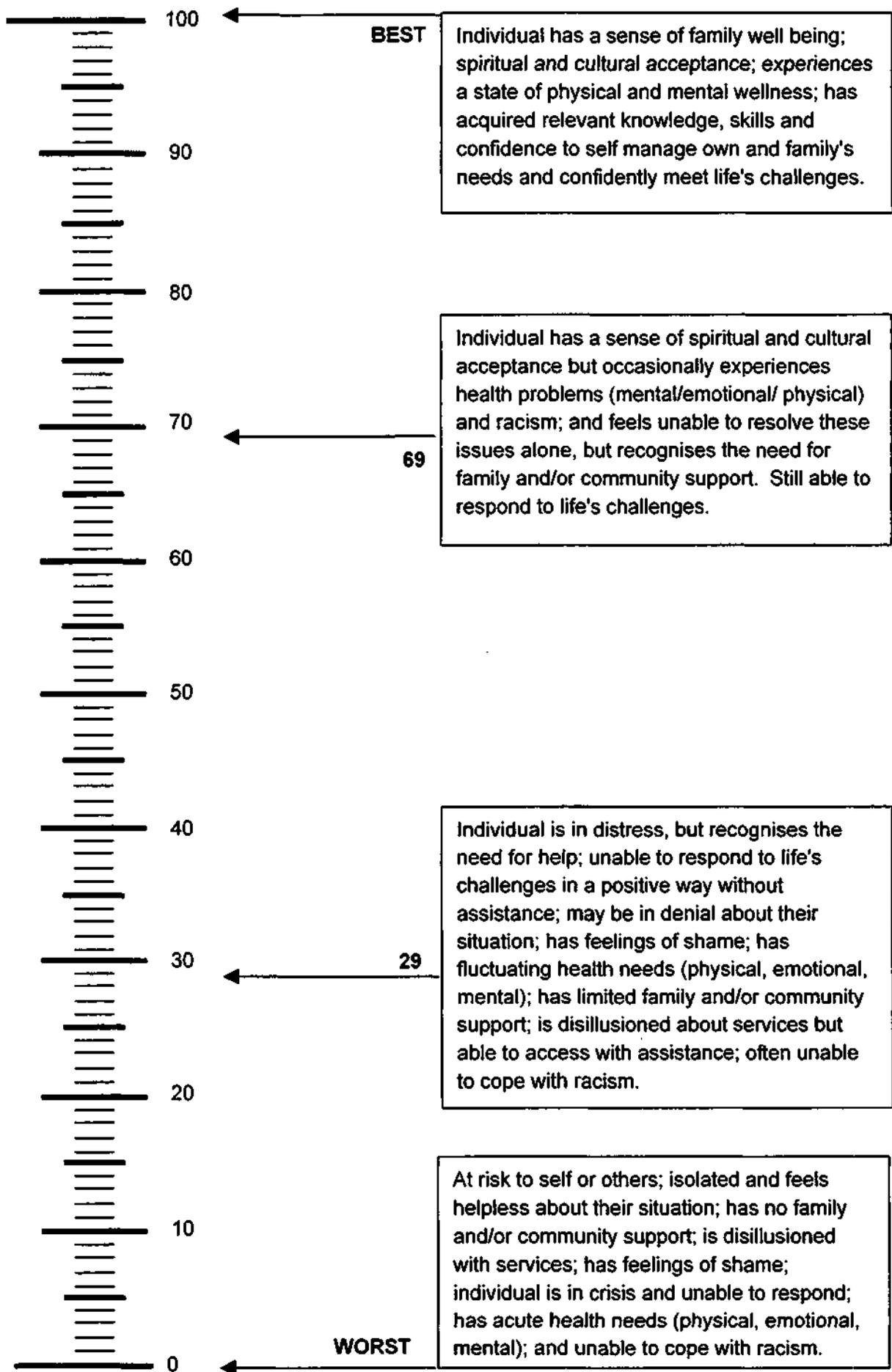


Figure 15: ISCHS Community Health Gain

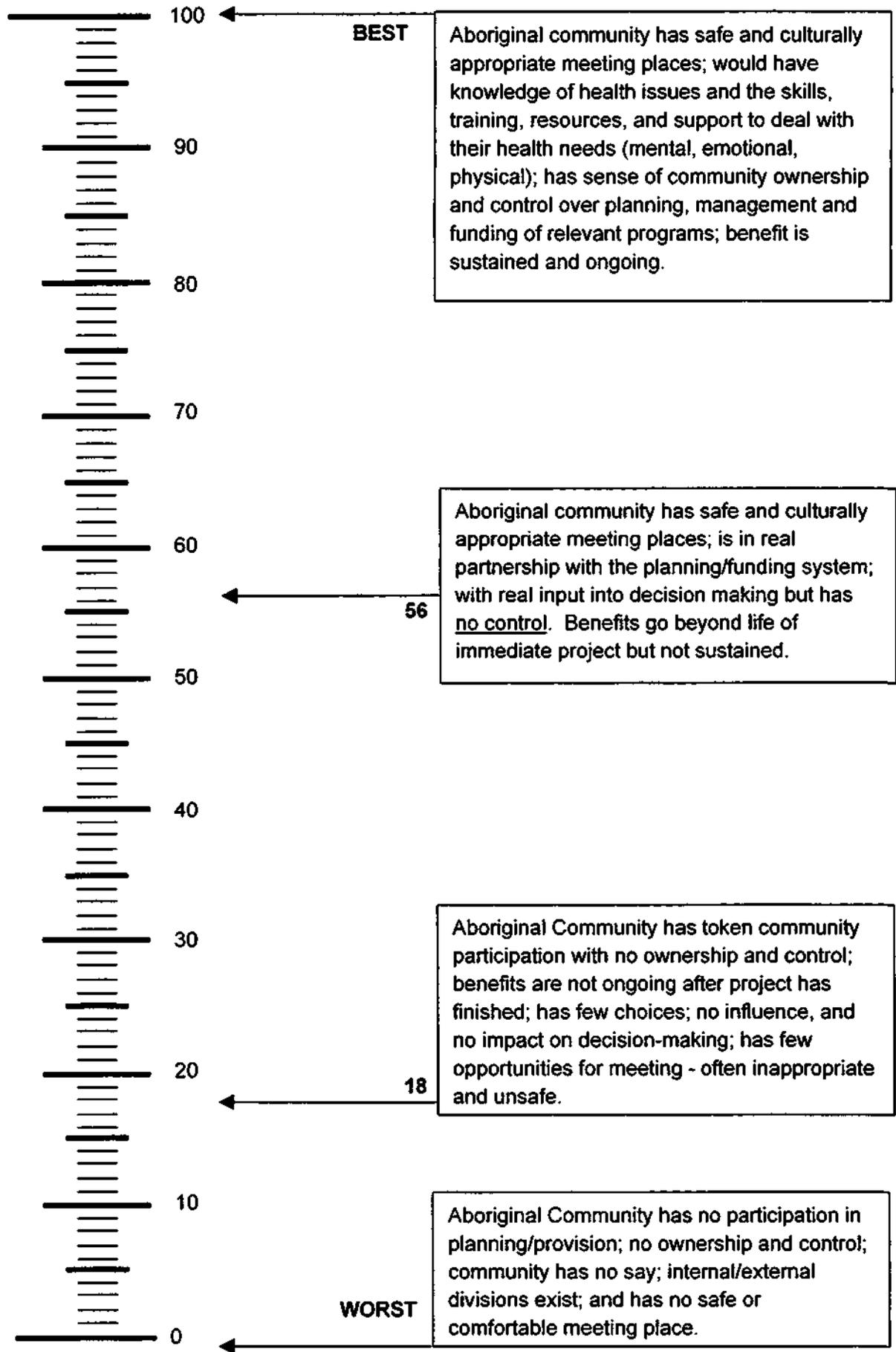
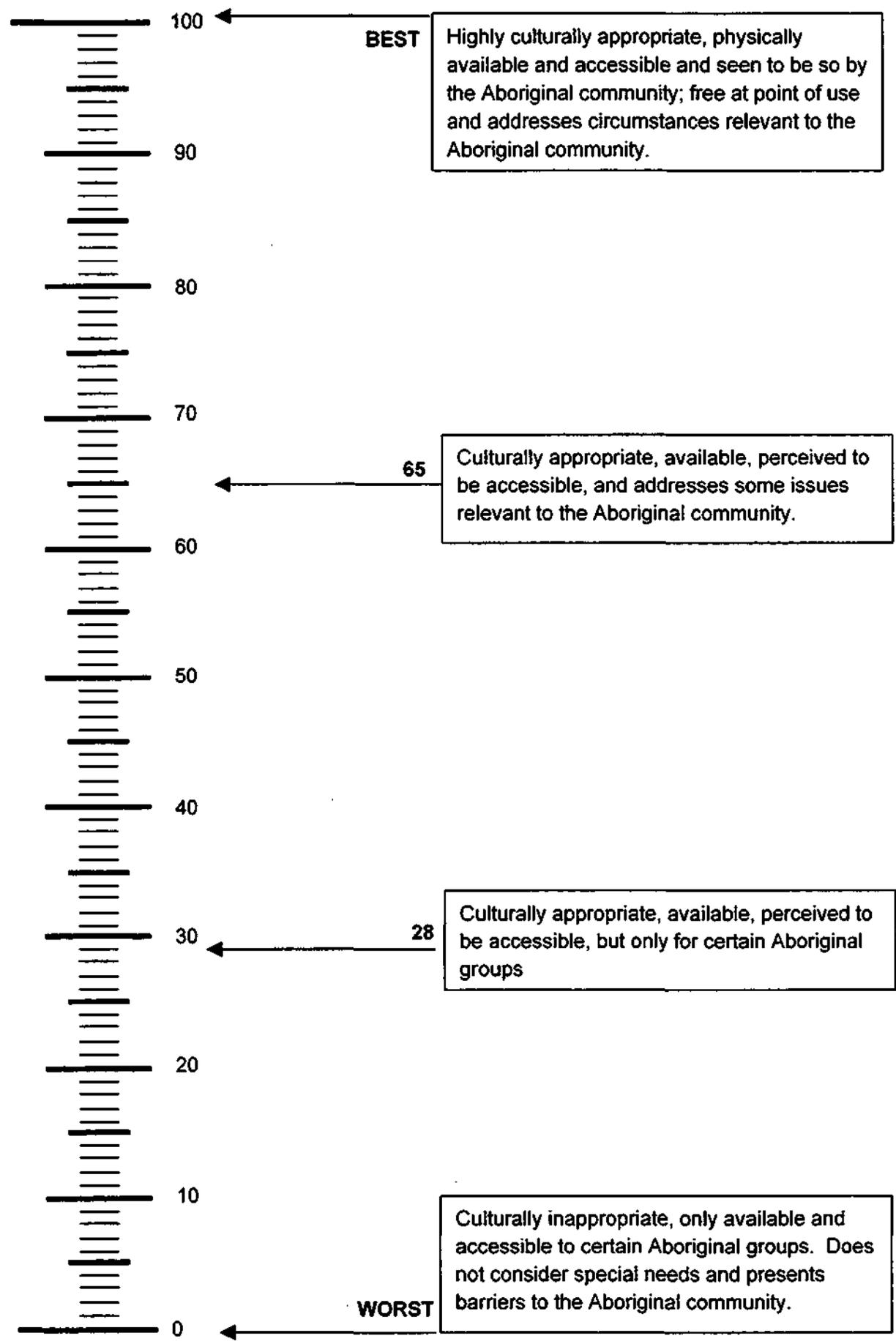


Figure 16: ISCHS Equity



The context for the equity dimension for each pilot study was defined as primary and community health services for the target groups in question.

The panel members in each individual pilot group were then given rating scales for each dimension, with the best state for each placed at 100, and the worst state placed at 0. They were asked, for each dimension in turn, to place the other descriptors where they thought it was appropriate between the best and worst states on the scale. To do this they were asked to think of the value associated with each descriptor relative to the best and worst states. This is equivalent to asking how much each panel member would be willing to pay for a move from the worst state in each dimension to the state given by the descriptor in question. Each individual panel member's responses were collected and the group average score for each descriptor calculated. The actual process to decide the level of satisfaction, which each panel member associated with the individual descriptions of each level of benefit, presented no real problems for each group. The group average scores used for the calibration of the dimension scales for each pilot are shown on their respective scales in Figures 5 to 16.

4.3 Importance Weights for Dimensions of Benefit

The next stage was to ask the panel members in each pilot study to assess the relative importance of the dimensions of benefit, viz. individual health gain, community health gain, and equity. The approach used to elicit the relative importance of the dimensions of benefit, was the "top-down and bottom-up" methods. This has been explained in section 3.3. Each of the panels involved found this part of the exercise quite difficult, partly due to the methodology used, and partly due to the difficulties associated with obtaining clear definitions of the dimensions of benefit. Most panel members across all pilots made several attempts to weight the dimensions before they were satisfied that they had understood the process to the best of their ability.

In the Men's and Children's pilot being conducted by ACCHS, the majority of participants had considerable difficulty dealing with the "abstract" concepts involved, particularly using the "top-down" model. They found that it was extremely difficult to imagine that community health and individual health were at their "best" level while equity was at its "worst", as the definitions implied that they might not be mutually exclusive. It was felt that if they were at their best, then the services provided would automatically be accessible for targeted groups and culturally appropriate, otherwise it would not be possible for the best level for individual health and community health to be achieved in the first place. The definition of the "worst" level for equity implies cultural inappropriateness and accessibility only for non-targeted groups with the implication that community health, at the least, could not be at its "best" level, since services are not directed at targeted groups. One panel member found the concepts so difficult that she was not able to weight the dimensions.

The panel members involved in the Aboriginal Health pilot in ISCHS also had problems with the methodology. After the first attempt to weight the dimensions of benefit, panel members were most uncomfortable with the score given to individual health gain. The methodology was explained again, and questions asked as to whether panel members had understood that the dimensions

were to be weighted relative to one another and not in absolute terms. Since this was not the case, it was decided to commence the process again. The results from the second attempt were also not agreeable to panel members who said that they placed more importance on community health gain. At this stage it was decided to commence with a score of 33.3% for each dimension and attempt to reach a consensus opinion by iteratively adjusting importance weights for each dimension. The results are shown in Table 2:

Table 2: Importance Weights for ISCHS

	Method	Individual Health Gain	Community Health Gain	Equity
First Attempt	Top-down/Bottom-up	42%	26%	32%
Second Attempt	Top-down/Bottom-up	38%	30%	32%
Third Attempt	Consensus	30%	35%	35%

The panel members involved in the pilot on Women's Health had similar problems dealing with the abstract concepts inherent in the methodology. After several attempts at weighting the dimensions of benefit there were mixed responses to the results. Several of the panel members who were service providers thought that community health gain and equity should have been higher, whereas the community members were willing to leave the weights as they stood. After much discussion, the final weights were agreed upon using the iterative process as for ISCHS starting with equal importance weights for all dimensions of benefit. Results for NMCHS are shown in Table 3.

Table 3: Importance Weights for NMCHS

	Method	Individual Health Gain	Community Health Gain	Equity
First Attempt	Top-down/Bottom-up	32.9%	31.5%	35.6%
Second Attempt	Consensus	31%	33%	36%

The importance weights attached to the dimensions of benefit varied between the different pilot studies and are summarised in Table 4.

Table 4: Importance Weights for Dimensions of Benefit

Pilot	Individual Health Gain	Community Health Gain	Equity
Women's Health NMCHS	31%	33%	36%
Men's/Children Health ACCHS	36%	30%	34%
Aboriginal Health ISCHS	30%	35%	35%
Injury Prevention NHS	49%	25%	26%

The most apparent difference in the results presented is the high score given to individual health gain in the injury prevention pilot. When asked to comment on this, panel members said that they were not comfortable with this from a "community perspective", but in light of the program area being considered, viz. injury prevention, which was mainly directed towards the individual, they were willing to accept the group's average results. One service provider in the Men's/Children's health pilot expressed concern that individual health gain had scored so highly, at the "expense" of community health gain, but was willing to accept the group's average results. In the Women's health pilot, a community member felt that individual health gain should have been ranked at a much higher level than the other dimensions. She felt that the findings did not give a true and accurate picture of what women like herself felt within the community.

The result which is most consistent across all pilots is the relatively high score given to equity. This result reflects the particular context of the studies involved, and may be seen as largely compatible with many of the principles which underpin Community Health internationally and in South Australia.

4.4 Options for Change

Prior to the options appraisal exercise, the Management Committee for each region was asked to prepare a list of 3-5 services to be considered as potential options for contraction and 3-5 services as potential options for expansion. They were asked to write a brief description of the services and the number of clients/individuals who receive/will receive that service, as well as a brief description as to how and why the services were chosen. As a result of this, very little time was actually spent at the options appraisal exercise in the identification of options for change. The exception to this was Noarlunga, where options for change had not been identified prior to the options appraisal exercise, which resulted in options selection taking up some of the workshop sessions.

In general, the groups displayed considerable willingness to consider changes to services in the future. The nature of the study, i.e. that it was a pilot and the results were not being implemented, had to be stressed however, as some participants were uncomfortable with the idea of having services in which they were directly involved considered as options for contraction. Similarly, there was some discomfort with the idea of considering contracting their colleagues' services.

The expert panel from ACCHS indicated that they would have preferred to be involved in the process of identifying the options for change, rather than the decision being left to the Management Committee. Other members of the group suggested that they would have preferred that the options be presented as a single list of options for change, rather than identify options for contraction and options for expansion. The options for the four regions which were identified, and subsequently evaluated, are briefly described below:

(a) Adelaide Central Community Health Service (Central)

The Management Committee referred to the following information when considering options for change:

- Summaries of the services offered during 1997
- Local Area Implementation Strategy (LAIS) preliminary findings for men and children
- Activities initiated during 1998

The Management Committee reviewed each activity and asked the following questions:

- At present, is this activity fundamental to ACCHS and/or other key direction areas?
- Is it the role of ACCHS?
- Is it within the mandate of another Agency to address this issue? Are there other Agencies who work in this area?

Activities were identified for contraction as:

- They were not consistent with ACCHS role/Strategic Plan key direction objectives.
- A change in the approach/rationale for the activity could increase the effectiveness of the service.

For each remaining activity the Management Committee determined a score by asking:

- What need is there for the activity?
- How effective is the activity? (Considered individual, community and systems changes).
- Does this activity positively address equity issues?

The Management Committee recommendations were:

Options for Contraction

- 1 **Hendon Primary Outreach**
Health information sessions with year 7 students addressing the theme "its cool to say no". The aim of the program is to address risk taking behaviour and provide an opportunity for Port Adelaide staff to further develop links with Hendon Primary School. The information sessions increased student understanding of health issues such as safe sex and STDs, and provided students access to health workers.
- 2 **Enuresis Program**
This program reduces the incidence of bed wetting. Other agencies have a primary responsibility to provide direct services.
- 3 **Children's Immunization**
The service aims to increase the levels of immunization in the Parks area by providing an accessible service. Other agencies have the primary role of providing immunization services.
4. **Unemployment Support Groups**
Three different programs are run through ACCHS to support the long term unemployed who are on low incomes. Participants may be on sickness or other benefits. Most participants are over 40 years of age, although the Inner West group is trying to increase the participation of younger people.

Options for Expansion

- 1 **Promoting Mentally Healthy Communities – Men's Group**
Benefits men from the Inner West area, between the ages of 40-55. The participants live alone, are isolated and experience reduced health and/or mental health. The participants meet to prepare a meal together and discuss common issues of concern and develop social support networks.
- 2 **Physiotherapy for inner-city homeless**
The physiotherapy clinical service will be offered for two sessions per week. It will act as a pilot to further explore the need for physiotherapy services for the inner city homeless.
- 3 **Taperoo Young Mums**
The aim is to create a supportive health promoting environment for young mothers residing in a local geographical area of high need, ie Taperoo. The group has an advocacy role and provides support for each participant while addressing needs relating to being young women and parents. The group addresses issues which help create a safe supportive environment for their children.

4 Health Committees in Schools.

Primary school students participate in a committee to identify health and safety issues for the school. The group identifies issues and actions to be taken to address these issues. In this way, the students participate in the decision making process within the school, and raise the level of awareness as to health issues influencing students. Student representatives report to other schools and therefore raise student and teacher awareness regarding health and safety.

(b) Northern Metropolitan Community Health Service (Northern)

The Management Committee based its options for contraction on the following considerations.

Due to a lack of available program data it was not able to evaluate all programs that would have been chosen for contraction. With this in mind, services which had similar target groups but different methodologies were chosen for contraction and expansion. With the Domestic Violence 1:1 counselling it was based on the perceptions of benefit and also from the evaluations and literature in relation to added benefits/outcomes for the women who hear other women's stories and gain support. It was thought that participants may get more benefit from a group program.

"Discoveries" was chosen as an option for contraction as there were no community development outcomes in the objectives of the program. This contraction would be offset by an expansion of "Silent Too Long", a program which had more of a community development focus.

Cervix screening was chosen as an area for contraction partly because of the clinical nature of the service but also because it was a service which was provided by other agencies (eg Family Planning; GPs).

Menopause information sessions had developed from community requests for information, however such information was available from the service and from other areas.

Options for Contraction

- 1 One to One counselling for domestic violence
The aim is to provide a safe, responsive environment for women to make contact with a service provider to access counselling services, addressing issues of domestic violence that are impacting on their lives.
- 2 Menopause information
Information and resources for menopausal women is provided, which enables them to make healthy choices which will enhance their physical/emotional well-being.
- 3 Cervix screening
To prevent the incidence of cervical cancer.

-
- 4 Discoveries (for victims of child sexual abuse.)
This service attempts to identify the effects of child sexual abuse on participants' lives, and assist them to make their preferred changes. It also helps overcome isolation, increase information and understanding.

Options for Expansion

- 1 Group for domestic violence
The services provided increase women's understanding of the power imbalance in abusive relationships and how this is linked to attitudes in the broader community. They also provide emotional support for women and break-down isolation, Women's knowledge regarding safety issues in relation to domestic violence is increased and they acquire a greater understanding and knowledge regarding domestic violence: eg myths, effects, cycle of violence, responsibility, legal aspects, effects on children. Assistance is given to women to develop their own strategies to protect themselves from the effects of violence.
- 2 Camp Coorong
This is a health education camp "to heal the spirit within". It brings Aboriginal women together in a safe environment that is culturally appropriate. It also brings together workers and women from different regions and different clans which helps build relationships.
- 3 Adelaide Women's Prison Project
The service is designed to meet the needs of women in prison by providing them with information on women's services. It also encourages discussion which promotes healthy options in stress management and general well-being.
- 4 Silent too long
The aim is to establish a support group for women who are survivors of child sexual assault. Women will be able to support each other and gain knowledge and skills to help them address their issues.

(c) Noarlunga Health Service (Noarlunga)

A variety of service options were considered from which a range of alternative community programs were detailed and costed for consideration in the expansions section. Four were selected by a voting process from the panel of experts. They included:

- 1 Peer Project
- 2 Subsidised Safety Wear/Safety Equipment Loan Scheme
- 3 Easter/Fathers Day/Christmas campaign
- 4 Quick Response

The areas of contraction were more difficult to identify. The objective was to have fewer preventable injuries for the target groups presenting to EPC. It was predicted that the savings from the lesser number of patients presenting with injuries could be transferred to the community health area to achieve better preventative outcomes from programs.

The Be Safe program does not include the target group but is aimed at the elderly who sustain injuries in their homes and a physiotherapist/occupational therapist goes to their home to evaluate hazards and teach the individual what needs to change to make their home safer and ensure safe practices in their home environment. The NHS staff did not feel this was a legitimate contraction option.

The data collected from the Program Budgeting phase highlighted that more than 30% of the patients returning to EPC were for representations from an existing condition. Not all of these patients were from the target group. In fact 2400 were estimated to be in the target group and this is closer to 8% of the attendances to EPC.

Two options were considered to address the representations, but both were excluded from further analysis as they failed to meet Management Committee criteria. The first option involved nursing staff being trained to provide treatment, including addressing prevention issues, for patients attending for re-presentations. This option was excluded from further consideration as the required increase in nursing workload could not be met within existing budget constraints, and there would not be a matching release of resources from medical staffing budgets. The second option was to refer the patients for further check-ups to their local general practitioners. A component for aftercare is included in the up-front fee paid under the Medicare agreement to NHS for these patients being treated in EPC. Another doctor then treating the patient would be entitled to bill NHS for this payment. There would be an increase in administrative and financial workload to receive, receipt and raise cheques for the general practitioners involved. Also quality assurance in the EPC could be disadvantaged. The patient could also be disadvantaged if the local doctor could not treat the person within their required time frame. The potential disadvantages of this option therefore also resulted in its omission from further consideration by the Management Committee.

The area of contractions was one of the hardest issues the Management Committee of NHS had to face, as the premise for undertaking the project was to address strategies in a hospital activity setting that could produce better outcomes for the individual and cost savings which could be moved from the hospital to the community setting for injury prevention.

Options for Contraction

1 Be Safe – Safety Curriculum Development

Develop and market curriculum models and resources which could be incorporated into community based programs eg TAFE, youth employment projects etc. This could be presented either by existing course trainers or using allied health staff as guest presenters.

2 Re-presentations

Options for Expansion

- 1 **Peer Project, Building on Joint Project with TAFE**
To provide a peer model where each trained participant will educate at least 10 others, and demonstrate activities in appropriate community locations
- 2 **Subsidised Safety Wear/Safety Equipment Loan Scheme**
In conjunction with hardware suppliers offer free/subsidised basic safety equipment, goggles etc. People who requested goods would be asked to participate in a brief safety training course and/or accept safety information. Demonstrations/displays at local hardware stores would focus on safety issues.
- 3 **Easter/Father's Day/Xmas Campaigns**
Using a broad range of strategies (advertising, stickers, leaflets, demonstrations, displays, prominent men as role models), focus on the three most significant times of the year when tools are purchased for/by men. The need to purchase additional safety equipment and/or use existing equipment safely will be emphasised.
- 4 **Quick Response – Injury and Allied Health**
Provides a quick allied health response to injuries on presentation to EPC and a priority outpatients service. Data indicate that the majority of men with sporting injuries within this project present during the weekend or after hours. The quick response would be met by having access to physiotherapists during these times. Currently all services are offered during business hours, Monday-Friday.

(d) Inner Southern Community Health Service

Options for Contraction

- 1 **Nunga Diabetes**
Provides diabetes education, podiatry services, nutrition education, training for Aboriginal diabetes educators, transport for participants. The services are provided individually and in groups. By employing an Aboriginal diabetes educator the service could be provided in a more culturally appropriate way for less cost.
- 2 **Food Co-op**
Provides access to shopping facilities in which Aboriginal people feel more comfortable. Also provides access to cheap and nutritious food items and recipes and reduces social isolation. Unfortunately, the Food Co-op has not been accessed by the community as frequently as first envisaged. Options for contraction would therefore involve a revision of the opening times and numbers of workers involved.

3 Elders Program

Provides services to decrease social isolation, increase trust to use mainstream services, renew contact with homelands and places of significance to the people. Provides opportunities to heal issues from the past and reflect on one's experiences. By providing transport for this program, using a volunteer or only one worker, the Elder's Program could continue to be offered with cost savings.

Options for Expansion

1 Immunisation

This service will provide increased access to culturally appropriate immunisation services for Aboriginal children and adults. This is of particular importance given the very low rate of immunisation in the Aboriginal population. This service would provide increased awareness of the benefits of immunisation and the effects of disease.

2 Youth Program

Provides a means of improving the social and emotional well-being of young Aboriginal people aged 12-25 years. The proposed benefits of this service include increased understanding and awareness of the culture for young Aboriginal people, increased access to services that are culturally appropriate, increased trust using mainstream services and the development of coping strategies and abilities to make healthy lifestyle choices.

4.5 Evaluating Options for Change

In evaluating the options for change in each of the pilot studies, the expert panels were instructed to use the rating scales developed earlier, with the descriptors, as shown in Figures 5 to 16, placed on the scales. These descriptors were to be used as a guide in estimating the scores on dimensions for each service considered. The scores for each service for each dimension of benefit were then combined using the multiplicative weights for health model outlined in Section 3.6.

To determine the scores for each dimension of benefit for the service being evaluated, the groups were instructed to approach this in the following way. For individual health gain the group were asked to consider a representative individual receiving the service in question, and asked to estimate their initial health score or state, and their final health score or state. The difference between the score for the initial and final states would give the representative individual's change in health status. For options for contraction individual health gain was assessed in terms of the potential change in health status an individual would experience from receiving that service. The measure of the change in individual's health was therefore a measure of the potential health related benefits foregone by not providing those services. For options for expansion, individual health gain was assessed in terms of the improvement in health for an individual who moves from a position of never having received the service in question, to receiving that service.

Scoring community health gain was carried out by asking the expert panels to estimate the level of community health associated with each service. This meant that under the model used for this study the change in individual health gain was weighted by the level of the community health a service provided, rather than the change in community health gain due to the introduction or withdrawal of the service.

In scoring equity the expert groups were also asked to estimate the level, or degree, of equity associated with the service in question (if it was provided). This score was then also used to weight the change in individual health gain for that service.

Having elicited the scores for each dimension from each regional group, the combined benefit score was calculated using the multiplicative weights for the health model. Essentially this model takes the individual health gain for a representative individual and weights that score according to the level of community health benefit and the level of equity associated with that service. That is, a service which gives lower individual health gain will get a higher score if that service provides high levels of community health benefit, and is highly equitable. In doing this calculation the model also accounts for the relative importance of the dimensions of benefit which were estimated earlier in the exercise. The final, combined benefit score shows a measure of the benefit to a representative individual receiving the service in question. The combined benefit score lies between 100 (best benefits) and 0 (worst benefits), so services with higher scores provide relatively more benefit in terms of individual health gain, community health benefit, and equity, than services with lower scores.

The dimension scores and combined benefit scores for the options are given by region in Table 5 (Adelaide Central), Table 6 (Northern), Table 7 (Noarlunga), and Table 8 (Inner Southern). Note numbers receiving benefit for options for contraction refer to estimates of the current level of activity, not a proposed reduction in the numbers of individuals receiving that service. Numbers receiving benefit for options for expansion are estimates of the proposed size of services.

All of the groups involved in each pilot exercise successfully managed to evaluate all options for contraction and expansion. However, there were some reservations from the panel members that time constraints had made it difficult to arrive at a meaningful assessment of benefit in some cases. This was not seen as a major problem in the context of the pilot studies, as the results were to inform future planning processes, rather than to inform current decisions.

5 COST-EFFECTIVENESS RESULTS

5.1 Costing Options for Change

The cost estimates for each region's options for change are also given in Table 5 (Adelaide Central), Table 6 (Northern), Table 7 (Noarlunga) and Table 8 (Inner Southern). Cost estimates for options for contraction (existing services) were derived from the program budgets developed by each of the regions involved. Cost estimates for the options for expansion (proposed services) were derived from estimates provided by members of the respective Management Committees. The number of individuals for options for contraction were the number of unique clients, or numbers receiving services, in the program budget (where available). For options for expansion, the estimated number of clients or individuals who would receive each type of service was given by the Management Committee for each region. Cost per individual figures were then calculated.

5.2 Cost-effectiveness of Options for Change

The combined benefit scores and cost per individual estimates were combined to derive an overall ratio of the cost-effectiveness for each service evaluated. The cost-effectiveness ratio, for a representative client for each service, is expressed as the ratio of the cost to the combined benefit score for each individual receiving the service. The cost-effectiveness ratio has a simple interpretation: for each service it shows how much each unit, of the measure of benefits used in the study, costs to provide. For example, a cost-effectiveness ratio of 5 implies each unit of benefit for an individual receiving that service costs \$5 to provide, or a ratio of 0.4 implies each unit of benefit for that service costs 40 cents to provide. The lower the cost-effectiveness ratio, the more cost-effective a service is. If, for instance, there was \$5,000 available to provide either of these services, then the most cost-effective service (with a ratio of 0.4) should be provided (all other things being equal) as it would give overall benefits of 12,500 versus benefits of 1,000 which would be provided by the alternative service (with a ratio of 5).

Table 5: Costs and Benefits – Adelaide Central CHS

Options	Numbers receiving benefit*	Individual Health Gain (H)	Community Health Benefit (C)	Equity (E)	Combined Benefit Score	Service Total Cost Estimate (\$) [†]	Number of Individuals	Cost per Individual (\$)	Cost/Benefit Ratio
Options for Contraction									
1 Hendon Outreach	30	5	25	50	3.0	7687	30	256	85.4
2 Enuresis Program	19	40	24	40	16.5	15901	19	837	50.7
3 Immunisation program	286	15	80	70	12.6	102223	286	357	28.4
4 Unemployment support groups	34	23	75	58	18.0	31261	34	919	51.1
Options for Expansion									
1 Physiotherapy for homeless	140	40	65	70	31.8	37800	140	270	8.5
2 Promoting mentally healthy communities	48	20	63	70	15.4	92600	48	1929	125.3
3 Taperoo Young Mums	45	25	74	70	20.5	23000	45	511	24.9
4 Health Committees in Schools	30 (900)**	30	75	75	25.2	41000	30 (900)	46***	1.8

* Numbers receiving benefit refers to estimates of current numbers of clients for options for contraction, and estimates of proposed numbers of clients for options for expansion.

** Numbers refer to 30 students directly involved and 900 indirectly involved but affected by the service.

*** Cost per individual based on 900 indirect contacts

† Costs presented here are based on the costing model developed for the PBMA study, and should be interpreted in light of the context of this study and the methodology adopted. They do not represent unit costs derived from an individual level costing exercise.

Table 6: Cost and Benefits – Northern Metropolitan CHS

Options	Numbers receiving benefit*	Individual Health Gain (H)	Community Health Benefit (C)	Equity (E)	Combined Benefit Score	Service Total Cost Estimate (\$) [†]	Number of Individuals	Cost per Individual (\$)	Cost/Benefit Ratio	
Options for Contraction										
1	1;1 Counselling for DV	228	47	0	30	19.7	45829	228	201	10.2
2	Menopause Information	13	23	30	30	11.9	1305	13	100	8.4
3	Cervix Screening	149	13	0	75	7.5	11199	149	75	10.0
4	Discoveries	79	30	0	20	11.5	6225	79	79	6.9
Options for Expansion										
1.	Group DV	117	32	30	25	16.0	15658	117	134	8.4
2.	Camp Coorong	30	27	55	80	21.1	5937	30	198	9.4
3.	Adelaide Women's Prison	67	15	0	39	6.8	10689	67	160	23.5
4.	Silent Too Long	116	22	60	20	12.8	23265	116	201	15.7

* Numbers receiving benefit refers to estimates of current numbers of clients for options for contraction, and estimates of proposed numbers of clients for options for expansion.

† Costs presented here are based on the costing model developed for the PBMA study, and should be interpreted in light of the context of this study and the methodology adopted. They do not represent unit costs derived from an individual level costing exercise.

Table 7: Costs and Benefits – Noarlunga Health Services

Options	Numbers receiving benefit*	Individual Health Gain (H)	Community Health Benefit (C)	Equity (E)	Combined Benefit Score	Service Total Cost Estimate (\$) [†]	Number of Individuals	Cost per Individual (\$)	Cost/Benefit Ratio
Options for Contraction									
1. Be Safe	236	39	22	0	21.2	66160	236	280	13.2
2. Re-presentations	2400	20	0	68	13.3	N/A	2400	N/A	N/A
Options for Expansion									
1. Peer Project	1000	29	65	80	24.9	43390	1000	43	1.7
2. Subsidised safety equipment	1000	29	22	80	21.8	56876	1000	57	2.6
3. Easter/Father's Day/Xmas Campaigns	30000**	29	20	80	21.7	19725	30000**	10***	0.5
4. Quick Response	832	39	0	100	29.2	49691	832	60	2.0

* Numbers receiving benefit refers to estimates of current numbers of clients for options for contraction, and estimates of proposed numbers of clients for options for expansion.

** Of the 30000 possible contacts, there are 2000 men in the 24-45 year target group

*** Based on target group of 2000

† Costs presented here are based on the costing model developed for the PBMA study, and should be interpreted in light of the context of this study and the methodology adopted. They do not represent unit costs derived from an individual level costing exercise.

Table 8: Costs and Benefits – Inner Southern CHS

Options	Numbers receiving benefit*	Individual Health Gain (H)	Community Health Benefit (C)	Equity (E)	Combined Benefit Score	Service Total Cost Estimate (\$) [†]	Number of Individuals	Cost per Individual (\$)	Cost/Benefit Ratio
Options for Contraction									
1. Nunga Diabetes with Fran	65	15	80	85	13	23580	65	363	27.9
2. Nunga Diabetes with Aboriginal worker	65	10	90	95	9.5	20727	65	319	33.6
3. Food Co-op at present	49	0	45	30	0	14245	49	291	**
4. Food Co-op with radical changes	49	10	75	65	8	12634	49	258	32.2
5. Elders at present	28	20	75	75	16.5	6033	28	215	13.1
6. Elders new	28	20	75	75	16.5	5147	28	184	11.1
Options for Expansion									
1. Immunisation	50	20	45	70	14	2172	50	43	3.1
2. Youth Health	150	15	60	70	11.5	9087	150	61	5.3

* Numbers receiving benefit refers to estimates of current numbers of clients for options for contraction, and estimates of proposed numbers of clients for options for expansion.

** A cost/benefit ratio cannot be calculated as the benefit score was zero.

† Costs presented here are based on the costing model developed for the PBMA study, and should be interpreted in light of the context of this study and the methodology adopted. They do not represent unit costs derived from an individual level costing exercise.

6. DISCUSSION: BENEFITS AND COMMUNITY HEALTH

At the conclusion of the marginal analysis phase of the studies, the expert panel and the Management Committees were asked for feedback on the content and the process of the options appraisal exercises. A number of issues emerged.

The consensus opinion was that the descriptors were very useful, but in hindsight those for Community Health Gain and Equity required refinement. In ACCHS (Men's and Children's Health) one panel member felt that it would have been more appropriate to write a set of descriptors specifically for their services or to have included public health indicators in the descriptors. Other panel members disagreed with this view and felt that the way in which the panel had gone through the process of formulating the descriptors was a better alternative. In their opinion, the process was one of learning and laid the basis for developing measures of benefits in the future. In NMCHS (Women's Health), the view was expressed that the descriptors would be written differently in a future exercise, because they were "not encompassing enough". The comments from NHS (Injury at Home/Leisure program) contrasted with the above sentiments as the panel felt that the descriptors aptly described the benefits clients received from services.

One of the main issues to arise was that of the inter-dependence of community health gain/family health gain and individual health gain. In the Aboriginal Health pilot, the community members expressed the view that community health gain and individual health gain are equivalent. If the health gain of an individual increases then the health gain of the community automatically increases as well, because the community is viewed as "whole", and the individual is not really considered in their own right. This viewpoint was also expressed in a slightly different context where individual health gain was seen as being part of family health gain. The question was asked of community members: "What is a healthy Aboriginal community?" The response was that it was one where extended families were together. Because the family was united, it was healthier. Traditionally communities shared the roles that families have today, eg food gathering, hunting. Each person had a particular responsibility and a purpose for being. This has been eroded because the welfare system provides food/handouts, resulting in dependency, loss of self-esteem and self-worth. The community members felt that individual health gain was part of family health gain which, in turn, was part of community health gain.

In the Men's and Children's Health pilot, the issue of separating individual health gain from community health gain also arose. The panel members defined the community as a set of individuals where community health gain would automatically increase if individual health gain increased. This was a dilemma for the participants, as although the two dimensions of benefit had been defined and described separately, when services were being considered, the two dimensions appeared to be "automatically" correlated. A further issue arose of "who was the client" when services addressed the needs of children through their parents. The decision was made to consider parent and child as one unit.

The issue of family health gain also arose in the Women's Health pilot. The panel members were of the opinion that if the individual woman's health increased as a result of receiving services, then the family benefited as well, because the two are inexorably linked. This was considered to be particularly relevant in cases of domestic violence where, if the nexus between victim and perpetrator was broken, the victim and her family would benefit simultaneously. Community health gain was also an issue. In order to define community health gain, it was felt that the definition of community itself should be clarified. Coupled with this was the temporal aspect of the health gain received from services. Some panel members felt that community health gain was long-term whereas individual health gain was in the short-term. As a result, there might be no community health gain associated with a program if the benefits of that program are examined after six months only, as the benefits might not accrue until well into the future.

The concept of equity used in all studies was that of fairness, in terms of social justice, for individuals and groups of individuals. Fairness may mean equality or inequality between individuals and groups, such that equals are treated equally (horizontal equity) and unequals treated unequally (vertical equity). A horizontally equitable service may be one which gives all individuals and groups the same opportunity to use that services, or it may be a vertically equitable service which gives greater opportunities to socially disadvantaged groups. Equity in health care is usually expressed in terms of access to health services, as equality of health across individuals is very difficult to achieve, and equality of use of health services restricts individuals' choices in health care decision making. After discussions with the individual expert groups, the concept of equity adopted across the studies, except for Aboriginal Health, was equal access for equal need (horizontal equity).

In discussions held after the conclusion of the various pilot exercises, some panel members argued that the descriptions of equity were not comprehensive enough to cover all aspects of services provided. One viewpoint was expressed that, since equity was multi-faceted, these facets should be individually defined and given different weights, rather than an overall weight for the dimension of benefit of equity itself. Another view was put forward that equity in service provision should be divided into two groups: equity for Aboriginals, and equity for "others". This concept fits the categories of vertical equity for the former and horizontal for the latter.

In the Men's and Children's pilot a more detailed and comprehensive description of equity was considered desirable for services to be fully and adequately evaluated in the future in terms of the various facets of equity inherent in service provision. The issue of local versus regional implementation of a service was also raised, and the bearing that this would have when considering equity and also community health gain in evaluating options. From a regional perspective, a service might not be considered as being particularly equitable, but seen from the local perspective, it could be highly equitable. For the pilot exercise on Men's and Children's Health, it was decided that a regional perspective was appropriate, as services were provided to serve the wider community.

The dominant theme to emerge from all the pilot exercises was that the concept of equity which best suited the philosophy of Community Health is that of unequal treatment for unequals.

The strategic plans for Community Health Services, whilst taking a population based approach to health issues, also highlight a range of target groups for certain health issues. Examples of these target groups include the socially and economically disadvantaged and Aboriginal people.

7. CONCLUSIONS AND RECOMMENDATIONS

The marginal analysis phase of the four PBMA pilot studies in Men's and Children's Health (Adeiaide Central), Aboriginal Health (Inner Southern), Women's Health (Northern Metropolitan) and Non-intentional Injury at home/leisure (Noarlunga) have been, in the main, successful. Both the Project Management Committees and the expert panels for the options appraisal exercises demonstrated considerable willingness, and at times patience, to embrace new concepts and ideas in priority setting. Their openness to the process, which addresses some very difficult and potentially uncomfortable issues, contributed significantly to the success of the pilot studies.

Both the Project Management Committee and expert panel received information and training in the principles of priority setting and PBMA. This training is intended to help inform strategic planning in community health in the long term. However, for these pilot studies to achieve this goal fully there is a need for the training of other community health and SAHC staff in aspects of priority setting, and a need for the wider dissemination of experiences with this study and its results. In particular, education of service providers is vital, as a lack of ownership by these staff members will dilute the usefulness of priority setting exercises.

The study has addressed notions of benefit in providing community health services in South Australia. Whilst these notions and definitions of benefits require further debate and clarification, they none the less represent a significant advance in the context of planning services in South Australia. Future priority setting exercises should revisit the definitions adopted in this study, and seek to clarify further their nature and the values that underpin them.

The options appraisal exercises resulted in the expert panels managing to use the agreed definitions of benefit to evaluate the effectiveness of their respective health services. Estimates of the costs per individual receiving services were derived from the program budget, prepared by each region for the options for change, either to expand or contract existing services. Estimates from the Project Management Committee were used for the cost of options for expansion where a new type of service was considered. Benefit and cost estimates were combined to derive a cost-benefit ratio for each service evaluated. This ratio gives an estimate of the cost per unit of benefit for each individual receiving the service in question. Tables 5 to 8 indicate that there was a mix of services considered to be relatively cost-effective (low cost-benefit ratios) amongst the options for contraction and expansion. This is not surprising, suggesting that some potential options for contraction appear to be cost-effective when subjected to more formal evaluation. Equally some options for expansion appear to be relatively poor in terms of cost-effectiveness. These results indicate the need for a rigorous approach to planning services based on the effectiveness of those services in providing benefits, and in terms of the resources used in providing those benefits.

When interpreting the cost-benefit ratios, it should also be borne in mind that the Project Management Committees for all four pilots expressed difficulties in arriving at the cost estimates for the options for expansion. These estimates may be less robust than the cost estimates derived from the program budget for existing services. In future, more time may be needed for

estimating the resource implications of options for expansion, and allowances made to discuss these at the options appraisal exercise. Particular attention needs to be given to estimates of staff and capital costs for options for expansion, and what component of each may be considered as variable or fixed costs. The level of fixed costs will have important implications for the expansion of services. Secondly, time constraints in the exercises prevented a full validation of the cost and benefit estimates for services. Again, in future, more time may be needed in revisiting estimates to check their validity. However, the need for revisiting cost estimates may be reduced through the development of data systems which generate the cost information needed for PBMA and service planning in general. Thirdly, the study did not fully address issues concerning the size and importance of: community volunteer time in service delivery; the costs of buildings and links in service delivery with other government and non-government agencies. Future work may be extended to give these issues fuller consideration and are linked to further consideration of the perspective to be used in PBMA (for example a societal perspective versus an organisational perspective).

The marginal analysis phase of the study should be seen primarily as a process of learning and understanding. The results of this study do not provide definitive guidelines to priority setting in community health, reflecting the study's pilot nature. It is clear that the study has addressed a significant number of key issues, but further work is still required in several areas. The key issues addressed by this study include: the notions of benefits and their importance in Community Health; the importance of allocative efficiency, marginal analysis, and opportunity costs in planning services; and the need to evaluate services both in terms of the benefits they provide, and the resources they use. Further work is still required in the areas of identifying and weighting dimensions of benefit, of estimating the costs and benefits of services, and in the training and education of community health service staff. However, the results of the study do provide some insight into the relative cost-effectiveness studies provide indications of some services which may, in the future, be considered as options for change.

It is important, however, that the results from this study are interpreted in their appropriate context. The cost-benefit ratios derived from PBMA studies are intended to be an aid to planning health services, and are not intended to be a definitive decision making rule. Many factors are considered in planning health services, of which cost-effectiveness may only be one, and these study results should be seen as one piece of information in aiding the planning process. The study results are also based explicitly on local judgement, and therefore should be used in conjunction with qualitative and quantitative cost-effectiveness information where it is available. Moreover, the results are therefore applicable to local circumstances and should only be generalised with caution.

Cost-benefit ratios generated by PBMA will be of use in the short to medium term in planning services. Services which have very low cost-benefit ratios should be interpreted as performing well under the criteria established by the study. Services which have very high cost-benefit ratios should be interpreted as performing poorly under these criteria. Intermediate cost-benefit ratios indicate services which need further work in evaluation.

Over time the resources used and the effectiveness of services may change, due to organisational changes, changes in the health services needs of populations, and advancements in service delivery leading to more effective services. Therefore, services may need to be re-evaluated in the medium to long term if particular circumstances have changed. PBMA is therefore an iterative process, which sets research agendas and which is aided by the development of data sources through time. The outcome is an ongoing management information system to aid service planning.

We believe that, on completion of this second phase of PBMA studies, the two year development of priority setting techniques in Community Health has been successful. The primary outcome of the studies has been a tangible change in the decision making culture of planning in South Australian Community Health Services. The pilot nature of these projects has allowed participants in the process to develop their understanding of concepts, methods, and application of priority setting tools. This has led to significant development of notions and descriptions of benefits from Community Health services in particular. The projects have established the foundations for the long term development of priority setting and planning in Community Health, and will inform planning in other sectors of South Australian health services.

On completion of the final phase of the PBMA pilot studies in ACCHS, NMCHS, NHS and ISCHS we would like to make the following recommendations.

The issues raised in the pilot studies should inform future PBMA studies and priority setting approaches. In particular:

- The PBMA process needs to be an integral part of service planning and review, rather than a one-off exercise, so that it becomes a long term management tool.
- There is a need for ongoing training of central office key people, and of staff at the local level, in order to secure ownership in the future.
- Process issues should be reviewed, in particular the time factor involved in preparation, education and staff support. There is a need for fuller recognition of the time commitment necessary for staff and community members involved in the process.
- PBMA should be linked with the annual planning process, and should be used as a method of both planning services and reviewing their performance.
- The dissemination of information to panel members involved in the evaluation of services for contraction/expansion should be more comprehensive. The project team should provide as much information as possible on the services concerning anticipated outcomes, benefits and a comprehensive description of the particular service. This could perhaps involve workers verbally presenting to the options appraisal group on the activities they provide. If this is the case, the workers involved will need to be prepared to be as critical and objective as possible.

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- PBMA in Community Health Services is a change process which intimately involves workers. Because of this, workers need to be able to express their views as to the benefits of services and have full knowledge of the process. This might include verbal presentations or written submissions.
 - Because of the difficulty expressed in grasping the concepts of weighting the dimensions of benefits, more practical, every day applications should be tested in a trial example.
 - The descriptors of benefits should be more detailed. It could be worthwhile to test these in a trial run in the first options appraisal session to check for applicability.
 - More time should be made available to cost the options for change, in particular the options for expansion.
 - Costing models and information systems should be developed which better inform decision making and planning processes.
 - More time should be allocated to the process of identifying and weighting the dimensions of benefit. In particular, the concept of "family benefit" should be examined and whether this is inextricably linked to the individual.
 - Descriptors for services which are preventative in nature and for public health activities should be examined and outlined.
 - The SAHC and Community Health Regions should seek to develop costing systems which provide management cost information for the planning of services.
 - There is a need for processes which result in consistent recording of activities, both qualitative and quantitative.
 - The experiences of the application of PBMA in Community Health should be used to inform planning in other health service sectors in South Australia.
 - The Department of Human Services and the SAHC should establish a coherent long term framework for health service planning.
 - This framework should include a commitment to the education and training of staff in the consideration of costs, outcomes, and marginal analysis in service planning.

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GLOSSARY

Allocative efficiency

Allocative efficiency occurs when total benefit across all individuals is maximised from the resources available.

Economic evaluation

Identification, measurement, and valuation of costs and consequences associated with alternative services, treatments, and health care programs. A generic term for cost-benefit, cost-effectiveness, cost-minimisation, and cost-utility analyses.

Fixed costs

Costs which, in the short term, do not vary as output increases or decreases.

Marginal analysis

Analysis of changes in services at the margin. That is, examination of changes to existing levels of service provision and not just whether an entire set of services should or should not be provided. Changes are assessed in terms of marginal costs and marginal benefits.

Marginal benefit

Benefit from providing one extra unit of a service, or from providing services for one extra individual.

Marginal cost

Cost of providing one extra unit of a service, or of providing services for one extra individual.

Opportunity cost

The value of benefits forgone when resources are employed for one use, but have other potential uses.

Options appraisal

Technique which uses an expert panel to identify services to be evaluated, and to provide cost and benefit estimates for those services.

Program Budget

A summary of the costs and activity associated with a program (a coherent set) of health services.

Variable costs

Costs which vary as output increases or decreases.

Visual analogue (rating) scale

A scale, or ruler, which is used to rank and measure health related benefits.

Weights

Fractions, or ratios, which reflect the relative importance of different entities.

APPENDIX 1

Steering Committee Membership

Ms Marguerite Tohl (Chairperson)	(Purchasing Office, SAHC)
Mr Richard Hicks	(Noarlunga Health Services)
Ms Liz Fudge	(Noarlunga Health Services)
Ms Sherin Reid	(Noarlunga Health Services)
Ms Adaire Garrett	(Northern Metropolitan CHS)
Ms Rachael Strauss	(Northern Metropolitan CHS)
Ms Julia Lamont	(Inner Southern CHS)
Ms Penny Roach	(Inner Southern CHS)
Ms Marj Ellis	(Adelaide Central CHS)
Ms Maria Zucco	(Adelaide Central CHS)
Mr Richard Cooke	(South Australian Community Health Research Unit)
Ms Nancy McWaters, (Project Manager)	(Purchasing Office, SAHC)
Ms Alexandra Hurley, (Project Assistant)	(Purchasing Office, SAHC)
Ms Jenny Cirillo	(Purchasing Office, SAHC)
Dr Stuart Peacock	(Academic Consultant, Health Economics Unit, Monash University)
Ms Diana Edwards	(Academic Consultant, Health Economics Unit, Monash University)

Management Committees and Options Appraisal Panels

Noarlunga Health Services

Mr Richard Hicks	Ms Karen Dixon
Ms Sandy Edwards	Ms Anita Mercer
Ms Elizabeth Fudge	Ms Mary Morriss
Mr Geoff Evans	Ms Michelle Nangle
Ms Susan Pettifer	Ms Deirdre Morrissy
Ms Sheryn Reid	Dr David Squirrell

Adelaide Central Community Health Service

Ms Maria Zucco
Ms Marj Ellis
Ms Rosalie Bonnin
Ms Olympia Kourakis
Ms Mary Ireland
Ms Lisa Edwards
Ms Raima Mahony
Ms Judith McPhee

Mr J Crowley
Mr Rob Webbe
Mr Harry Stewart
Mr Colin Williams
Mr Paul Flanagan
Mr Mick Piotto
Ms Mala Morghana
Ms Elyse Jorey

Inner Southern Community Health Service

Ms Julia Lamont
Mr Terry Kent
Ms Lyn Anderson
Ms Frances Marasso
Ms Jenni Wilson
Ms Carmel Kitsch

Ms Penny Roach
Ms Margaret Nelson
Ms Fran Wanders
Ms Catherine Morgan
Ms Margaret Carty

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Ms Karen Green
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Ms Evelyn Mauroudis

Ms Heather Gale
Ms Tina Dabinett
Ms Sue McKinnon
Ms Adair Brown
Ms Liz Brown

Facilitators for the Options Appraisal Exercise

Dr Stuart Peacock	(Health Economics Unit, Monash University)
Ms Diana Edwards	(Health Economics Unit, Monash University)
Associate Professor Rob Carter	(Health Economics Unit, Monash University)

APPENDIX 2

Proof for multiplicative weights for health model

The 'basic' model is given by:

$$B = [1 + w_1 d_1 + \dots + w_n d_n] B_H$$

where the weights, w_i , and are given by:

$$w_i = kW_i/M$$

and

$$B_H = hM$$

Substituting for these yields:

$$B = \left[1 + \left(\frac{kW_1}{M} \right) d_1 + \dots + \left(\frac{kW_n}{M} \right) d_n \right] hM$$

Next substituting for k , where

$$k = \frac{100 - M}{\sum W_i}$$

Gives

$$B = \left[1 + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_1 d_1}{M} + \dots + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_n d_n}{M} \right] hM$$

and substituting for d_i and h yields.

$$B = \frac{H}{100} \left[M + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_1 D_1}{100} + \dots + \left(\frac{100 - M}{\sum W_i} \right) \frac{W_n D_n}{100} \right]$$

APPENDIX 3

AQoL Descriptors for Individual Health Gain

Health States	AQoL-Utility
Health state 1	100
Health state 2	75
Health state 3	46
Health state 4	21
Health state 4b	0
Health state 5	-21

Health State 1

An individual does not or rarely uses any medicines at all, they do not use any medical aids, and do not need regular medical treatment. They need no help with their personal health care, the need no help with household tasks, and can get around their home and the community without any difficulty. Their relationship with their friends, partner or parents is warm and close, they have plenty of friends are not lonely and their role in the family is not affected by their health. They can see and hear normally, and have no trouble communicating with others. They sleep without difficulty most of the time, they are not anxious, worried or depressed, and they do not suffer from pain.

Health State 2

An individual does not or rarely uses any medicines at all, they do not use any medical aids, but they have some regular medical treatment. They need no help with their personal health care, they need no help with household tasks, and can get around their home and the community without any difficulty. Their relationship with friends, partner or parents is warm and close, they have plenty of friends are not lonely and their role in the family is not affected by their health. Although they see normally, they have difficulty hearing things clearly and often do not understand what is said. They have some difficulty being understood by others, although they have no difficulty understanding what is said to them. They sleep without difficulty most of the time, they are not anxious, worried or depressed, and they do not suffer from pain.

Health State 3

An individual uses one or two medicinal drugs regularly, and occasionally uses a medical aid. They have regular medical treatment, but are no dependent on this. They need no help with their personal health care, they need no help with household tasks, but they find it difficult to get around their home and the community by themselves. Their relationship with their friends, partner or parents is sometimes warm and close, and although they have friends they are sometimes lonely. Because of their health there are some parts of their family role they cannot carry out. They can see and hear normally, and have no trouble communicating with others. Their sleep is interrupted some of the time, but they are usually able to go back to sleep without difficulty. They are slightly anxious, worried or depressed, and they suffer from moderate pain.

Health State 4

An individual uses three or four medicinal drugs regularly, and a medical aid. Although they have regular medical treatment they are no dependent upon this. Occasionally they need some help with personal care tasks and they need help with the more difficult household tasks. They cannot get around the community by themselves, but they can get around their home with some difficulty. Their relationship with their friends, partner or parents is warm and close, although they are occasionally lonely. Because of their health there are many parts of their family role they cannot carry out. Their vision is impaired and they have some difficulty focusing on things or do not see them sharply, even when using their glasses. They also have some difficulty hearing and do not hear clearly, even when using their hearing aid. They have some difficulty being understood by others, although they have no trouble understanding what others are saying to them. Their sleep is interrupted most nights, although they are usually able to go back to sleep without difficulty. They are moderately anxious, worried or depressed and they suffer from moderate pain.

Health State 4b

Health state 4b is death.

Health State 5

An individual uses five or more medicinal drugs regularly, they have to constantly take medicines and are dependent on a medical aid. Their life is dependent upon regular medical treatment. They need daily help with most or all personal care tasks, and need daily help with most or all household tasks. They cannot get around either their own home or the community by themselves. They have no warm or close relationships, and are socially isolated and lonely. Because of their health they cannot carry any part of their family role. Even with the help of their glasses they can only see general shapes, or are blind. They hear very little indeed, even with the help of their hearing aid, and they cannot adequately communicate with others. They sleep in short bursts only and are awake for most of the night. They are extremely worried, anxious or depressed and suffer from unbearable pain.

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