CHILD, YOUTH & FAMILY DEVELOPMENT

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Evaluating replacement childcare arrangements: methods for combining economic and child development outcome analyses

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INTRODUCTION

HIV/AIDS has many impacts, among which is the effect of the epidemic on children. Children may themselves be infected, they may be living with, and possibly caring for, ill parents or other family members, and many will lose one or both parents. There are numerous aspects that will be required in a comprehensive response to these impacts, one of which is the provision of care for those who have lost parents or whose parents are too ill to care for them.
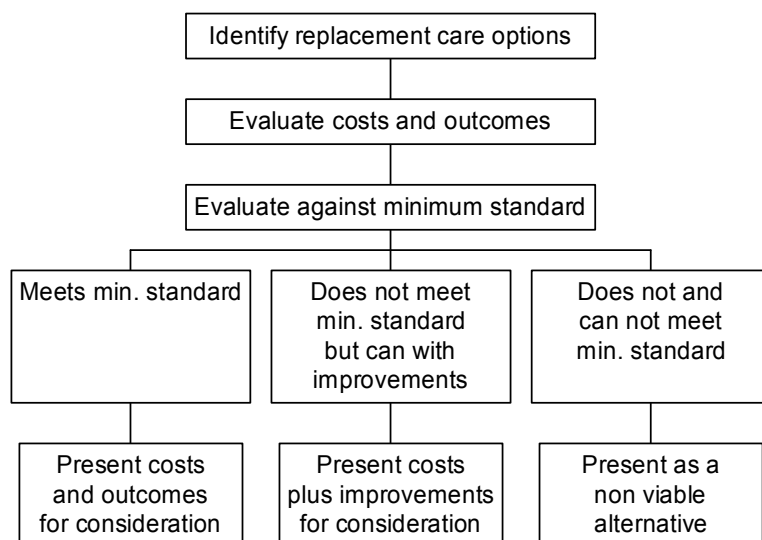
While only one aspect of the required response, this replacement[1] care, involves difficult decisions. Governments, non-governmental organisations (NGOs) and individuals are already struggling with alternative approaches, or models, of providing support to children who need new care arrangements as a result of the loss or incapacitation of their caregiver. As the scale of the problem increases so efforts to respond to it will have to be expanded, including those aimed at providing replacement care.

There are many different ways of providing care to children, so a number of alternative models of care are appearing. Some children remain in their original homes and another family member takes on the role of primary caregiver. At the other extreme, some children are removed from their homes and communities and live in formal institutions. In between these two extremes are a host of alternative models, from foster care to children's villages and so on. While a range of options is required, as no one model will be appropriate in all situations and settings, decisions will have to be made as to which models should form the core of the response. Again it will not be a single set of models that should form the core in every setting, as circumstances may alter requirements. What is needed are ways to identify appropriate models and to supply decision makers with relevant information on the alternatives in order to support the policy making process.

A variety of different types of information are required to inform decision makers in this area. This paper seeks to develop methods of providing some of that necessary information. Its emphasis is on linking the costs of models to their outcomes. As outlined in the following diagram, this is one part of what is required to support effective, equitable and efficient decision making.

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[1] Replacement in the sense of replacement of the parent or primary care giver who has died, not necessarily removal from the home or community.

Figure one: Information support for policymaking regarding replacement care

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                    ┌─────────────────────────────────┐
                    │ Identify replacement care options │
                    └─────────────────────────────────┘
                                    │
                    ┌─────────────────────────────────┐
                    │   Evaluate costs and outcomes    │
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                    │ Evaluate against minimum standard │
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   ┌────────────────┐ ┌────────────────┐ ┌────────────────┐
   │ Meets min.     │ │ Does not meet  │ │ Does not and   │
   │ standard       │ │ min. standard  │ │ can not meet   │
   │                │ │ but can with   │ │ min. standard  │
   │                │ │ improvements   │ │                │
   └────────────────┘ └────────────────┘ └────────────────┘
            │                 │                   │
   ┌────────────────┐ ┌────────────────┐ ┌────────────────┐
   │ Present costs  │ │ Present costs  │ │ Present as a   │
   │ and outcomes   │ │ plus improve-  │ │ non viable     │
   │ for            │ │ ments for      │ │ alternative    │
   │ consideration  │ │ consideration  │ │                │
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For any community, area or country that policy makers are attempting to plan for, alternative options to providing care need to be identified. As alternatives will have different implications for children's development and well-being, these outcomes need to be measured in order to understand the effectiveness of the model. Models, however, will also require different resources to operate and therefore will differ in cost. For planning and policy formation, these costs need to be considered to ensure resources are used efficiently and that they are equitably distributed.

Some models may be inadequate: children may be malnourished or emotionally scarred by living in such arrangements. What is required is to set a minimum standard that is a standard of care that provides the subjectively determined acceptable minimum level of care. This minimum would have to consider, among other things, what the minimum nutritional requirements are, what the minimum level of acceptable education is and what the maximum level of distress to child is which can be accepted. As adequacy is a subjective question, this standard may differ according to the policy makers or community involved.

Once a minimum standard has been set, model outcomes should be evaluated against it. It may, however, not be possible to have clear cut off points. For example, in the method presented in this paper, outcomes are measured in four categories: health and nutrition, emotional well-being, education and living arrangements. For outcomes related to health and nutrition, education and living arrangements the establishment of minimum standards is difficult but possible; for emotional well-being they are hard to imagine.

Assuming that minimum standards can be, and are set and model outcomes are evaluated against them, they can then be meaningfully presented in three ways. Firstly, those models

that pass the minimum standard can be presented as is and compared with each other, highlighting by how much they pass the standard and what they cost to achieve these outcomes. Models that do not pass the standard should be dealt with in two ways: those that will never pass should be presented as non-viable alternatives; those that could pass with some changes should be presented as possibilities, but the cost presented should include the costs of necessary improvements. Models, which do not meet the minimum, but could with improvements, are likely to be common, for example community-based models where the children may simply need more material resources and the model will pass the standard. Incorporating the costs of improving these models is important ad simply presenting the costs of models that do not pass the minimum may be misinterpreted as presenting efficient models, as the costs are likely to be low, when they are actually cheap models providing sub-minimal care.

Once the above information has been made available, one model will not necessarily present itself as the correct alternative. Unless a model outperforms all the others on all the outcomes and is cheaper, then trade offs will have to be considered. Some models may only just pass the minimum while others may pass by some measure, but cost more. Deciding if these improved outcomes are worth the additional cost is a question of the value placed on the outcomes and would require debate.

A number of cautions should be considered regarding the above outline of information needs. As mentioned already, this information model is not suggesting that there will be a single model of care that should be promoted. A continuum of care will be needed; there will be instances where while a formal institution has higher costs and poorer outcomes it will still be required as a last resort. What is being suggested is that there are different costs and outcomes across models and that these need to be considered when expanding the response. The information outlined in the above framework would help support decision-making, but in the end subjective valuations and consideration of local environments will determine the way forward.

Considerable work has already been done towards providing the information outlined in the above framework. Richer et al, for example, provide a detailed review of existing programmes aimed at providing support to orphaned and vulnerable children (2004). While considerable information has been collected on what option exist and some evaluations have been done very few studies have examined the costs of interventions in a manner that is useful to policy makers; even fewer have linked costs in anyway to differential outcomes.

A number of the studies that have considered costs have done so only from a financial perspective: that is, what it costs to provide the service, for example Lee's evaluation in Zimbabwe (1999). Another example is the South African Department of Social Development's recently released study on the financial costs of government-subsidised residential care (SADS, 2004). A number of other similar financial costings have also been conducted and reported on, and a summary of these can be found in Subbarao and Coury,

2004. While useful for planning increased coverage of existing programmes that are known to work, such approaches are of limited use in planning an expanded response, which requires comparisons across models. Financial costing alone is an inappropriate approach for evaluating alternatives. Firstly, it is necessary to consider not only the financial costs to providers, but also the broader costs to society, which a financial costing ignores. For example, financial costings typically do not consider the costs to communities of supported community-based approaches, including only the costs of the support, making them seam less costly than they are. Secondly, to facilitate meaningful comparison some measure of the success of approaches - some outcome that is - is needed.

Efforts have been made to address the shortcomings of financial costings; Menahem et al, for example, consider economic costs (2004). That is, the value of resources that are used by programmes is considered, regardless of who pays for them. Desmond and Gow also used an economic costing approach and further tried to address the problem of differential outcome measures (2000). They examined what it would cost to provide a common minimum standard of care across different models. Their method, while an attempt at addressing the effectiveness issue, is limited in a number of ways. Material care alone does not determine all outcomes and identifying an efficient means of supplying material care does not necessarily mean that that model is the appropriate way forward (Desmond, 2002).

This paper seeks to build on earlier work in the area by developing methods to further link the costs of different models of care more closely to the outcomes. Moreover, it aims to present a means of understanding some of the links between models and outcomes; that is, to understand how the models lead to different outcomes.

The methods that are developed in this paper are concentrated on the early part of the information outline discussed above. They do not seek to address the issue of how to establish a minimum standard and compare it to the outcomes. The methods do, however, aim to find ways to measure outcomes for later comparisons to a minimum standard. Further work is needed to design a method/approach for setting a minimum standard and identifying and costing improvements that would help existing models meet the minimum.

This paper presents an outline of the methods developed and discusses in detail some of the issues that were identified as the team worked through the problem. The methods are the focus of the work but, to examine their appropriateness and the possible difficulties in using them, a small pilot study was conducted.

The pilot study involved a small sample and conducted in a single geographical area. The pilot was an attempt to understand the processes taking place and the way in which the costs and benefits should be described and measured if they are to provide specific recommendations for action. As a result of its size and limited coverage this study may not generalise directly to other cultural and economic contexts in Africa, but similar investigations in other contexts will experience similar problems of conceptualising

appropriate indicators of child development and of selecting appropriate measures and analytic methods.   Although generalisation of the pilot study results is inappropriate, they are presented, but are only meant as an example to highlight the methodological issues and should be treated as such.

METHODS

The primary aim of this research project, as noted above, is to assist in the development of evaluation approaches, which combine both costs and outcomes of models of care.   The following section outlines the methods developed and tested in the pilot study.   While the method was designed with the pilot study in mind, the general approach is intended to be transferable.

COSTING

The costing conducted in this research project is of an economic nature: that is, the aim of the costing is to identify and value the resources used in the provision of care.   Unlike a financial costing, which might consider only the cost of resources paid for by an organisation or an individual providing a service, an economic costing considers all resources, even if the implementer does not pay for them.   This approach means that such things as donated goods or volunteers' time are valued and included in the costing as they represent resources that could have been used elsewhere.

The costing in this pilot study involved two different settings: care provided by a cluster home and care provided by individual households.   These two settings differ in a number of regards that affect the way in which the costing is approached.   The major difference is that, while the cluster home exists to provide care, the individual households exist for more than the provision of care to orphaned children.   This difference means that every cost associated with the cluster home is a cost of the care provided, as the care is the primary function of the home.   Individual households, however, will have costs that are related to other activities and functions and are not related to the provision of care.   A second major difference is that, as an NGO, the cluster home is required to keep detailed financial records whereas households are not.   A third difference is that the majority of staff at the cluster home are paid to provide the care; in the individual households care work is unpaid.

As a result of the differences between the two settings, very different methods had to be used in both the collection and analysis of cost data. The method used for each is outlined in the following sections.

Cost estimation for the cluster home

The starting point for the cluster home costing was the examination of the financial statements of the NGO providing the service. While the home's function is the provision of care to orphans and vulnerable children, the NGO itself had other functions. The organisation runs a feeding scheme for school children, a food parcel programme for vulnerable households, and is involved in home-based care and a drop-in centre. Not all of the costs incurred by the organisation could, therefore, be attributed to the cluster home.

Fortunately, the financial records of the NGO differentiated between expenditures on the cluster home, the children's education, and other activities of the organisation. It was assumed that their division between the various activities was the most accurate available. These records, therefore, formed the base of the costing, as they reflected the financial costs of care.

In addition to financial expenditures, a number of other resources were utilised in the running of the cluster home. These included the value of the property itself and donated goods and services. The property had been donated to the NGO and the purchase price was available. The price, however, includes the value of the land, which is not diminished through its use as a residential property. The relevant cost is the cost of the use of the property. The value of the property was estimated in two ways: firstly, by obtaining an estimated value and useful life of the buildings on the property and calculating a monthly cost; secondly, by examining the local rental market. Both methods yielded similar results.

A list of donated items is kept by the NGO and the previous year's entries were examined. The descriptions provided on the list were, however, not detailed enough to estimate the value of donated items accurately. It was, however, possible to ascertain a rough idea of the value of donated goods.

While the organisation does employ staff and their salaries are reflected in the financial statements, there is also a heavy reliance on donated time. This was particularly significant at the management level of the NGO. Interviews were conducted with employed staff and volunteers to determine the amount of time spent and the types of tasks performed. Two options for the valuation of volunteers' time were considered: the first was to value it on the opportunity cost principle - that is to value it at what they could have been earning; the second option was to cost it at the rate you would have to pay to employ someone to do the same task to a similar standard. The first approach is driven by individual characteristics and can be misleading. For example, an engineer may volunteer to spend time playing

with the children. To cost their time as that of an engineer would inflate the cost of the model. Rather the second approach, which values such time at the cost of employing someone to play with the children, was used. This reflects the intention of the method, which is to provide input into a policymaking process considering replication, as opposed to costing of the model as an end in itself.

The financial costs reflected in the records sometimes need to be adjusted if they do not reflect the true value of resources. For example, a store may give a large discount to a care provider and, while the cost of good purchased would be reflected in the statements, it would only be a fraction of the true cost. This, for the most part, did not appear to be a problem with the statements of the organisation concerned, with one exception. The salaries reported in the financial statements reflect the amounts paid for rather than the value of the labour. There is an element of volunteerism in the work done by the women running the home, in that it would be difficult to replace them, or rather to replace them with others who have similar levels of commitment, for the salaries they receive. To reflect the true value their salaries should be inflated to market rates. There was, however, no easy way to determine what they should be inflated to; they were, therefore, left unchanged. It should, however, be kept in mind that the salaries are thought to be an underestimate of the value of the time spent.

All of the above costs were added together to estimate the economic cost of the care provided. Reporting this total would, however, be of little use as it is to a large extent determined by the number of children in the cluster home. To provide more meaningful information, the costs were divided by the number of children in the home and the number of months out of the last year they had spent there. The resultant output was, therefore, the cost of the cluster home per child per month. The results, therefore, reflect the cost at the current scale of operation.

The estimation of the costs of the cluster home was simpler than the costing of care provided in the individual homes. The method used for the individual homes is outlined below.

Costing of care in individual homes

The estimation of the costs of caring within individual households can be divided into four components: expenditure on the child, allocation of household expenses, value of donated goods and service, and the household labour costs. The methods used to deal with each of these components are discussed in this section.

Expenditure on the child

A number of alternative methods for allocating or estimating expenditures on children have been proposed in the literature. They are often presented as methods for estimating the cost of children. Many of these methods are designed for use with large data sets typically containing households with and without children.

One method has been to use a 'basket of goods' approach, which involves the development of lists of goods needed to provide care to children and the costing of that list. Experts may be consulted to determine what items should be included on the list or lists, as at times a list of basic goods and a more generous list are used (see for example Saunders, 1999). A possibly useful method for estimating what it 'should' cost it is not appropriate for the problem at hand, which is to estimate what it actually costs.

A variety of methods designed to estimate what it actually costs use econometric techniques to compare expenditure patterns in households with and without children and between households with different numbers of children (see for example Kebede, 2003; Valenzuela, 1999). The appropriateness of these alternative methods is not yet resolved. They need not be discussed here, however, as all the households in the sample for this study contain children; moreover, the sample is far too small to use such approaches.

While comparing expenditure data across households with no or different numbers of children was not possible, it was possible to examine expenditure levels. Interviews were conducted, typically with the primary caregiver, on household expenditures. Respondents were asked to place the last month of household expenditure in an appropriate range. In addition to being asked for total expenditure, respondents were asked what was spent on a number of different categories. The responses to these questions provided a second estimate of the total household expenditure. While some household expenses may have been missed, as the respondent may not have known about them, it is unlikely that these would have been on goods consumed by the children in the household and so would not be relevant.

Total household expenditure is, however, only a starting point; what is required is an estimate of expenditure on the orphan child within the household. While expenditure on the orphan child specifically would have been ideal, it was not possible to estimate as the methods required would have been too resource intensive. It was assumed, therefore, that an estimate of expenditure per child in the household would suffice. This assumption is questionable and work has been done to investigate if orphan children receive equal treatment within the home (see for example Case et al, 2004). Given the difficulty in obtaining even an estimate of expenditure per child, seeking means of differentiating between expenditures on different children would have overly complicated the study and in all likelihood added little value.

To estimate the expenditure per child a number of steps were taken. For each expenditure item respondents were asked if the item was for children only, was shared, or was only for adult consumption. Items that were only for adult consumption were excluded from the analysis. The remaining expenditure was allocated based on consumption weights. This approach draws on the methods used in estimating equivalency scales. Children are assumed to consume less than adults; to account for this, when measuring welfare across households, researchers divide the total household expenditure by the number of adult equivalents. The number of adult equivalents is determined by the weight attached to children's consumption compared to adults. For example, in a household with two adults and four children, if children are assumed to consume half that of adults then there are four adult equivalents in the household - assuming there are no economies of scale. More precisely the method[2] works as follows:

$$AE = (A + \alpha K)^{\theta}$$

Where A is the number of adults, K the number of children, α the relative cost of a child and θ controls for economies of scale. The relative cost of children to adults is set between 0 and 1 depending on the assumed distribution within households. It has been argued that in poorer countries the figure is as low as 0.3 but is much higher in wealthier communities - possibly above 0.7 (Deaton, 1997; Deaton and Zaidi, undated).

While we are not concerned here with estimating adult equivalents, if we draw on the research in this area and assume that children consume between 0.3 and 0.7 of the adult level of consumption we can estimate a range of possible consumption levels for children within our sample.

Allocation of household expenses

While there is general agreement that children consume less than adults and that divisions of expenditure should account for this, the consumption of living space is more debatable. Given that there is less information on the appropriate split in housing costs between children and adults, for the purposes of this analysis it was decided to divide housing costs evenly across household members.

The value of housing was estimated based on the replacement value of the structure and its estimated useful life. A variety of structures were identified, so a range of costs were included.

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[2] There are actually a number of methods such as the behavioural and subjective approaches. This is a description of the arbitrary approach which works best for the explanation intended. For a more detailed discussion see Deaton and Zaidi, undated.

Donated goods and service

A number of the households included were purposely sampled because they were receiving some sort of support in kind, notably food parcels. Such support was valued and included as an additional expenditure. It was thus divided between household members in the same manner as purchased items.

The value of food parcels included the cost of delivering them and the costs of administering whichever programme was responsible for the distribution.

Household labour

Attaching a value to the household labour required to care for a child was the most difficult theoretical aspect of the costing. Assigning value to unpaid care work is not a new exercise, but there were particular difficulties with the setting and the nature of this work that complicated the situation.

Traditionally there are four main approaches to attaching value to unpaid care labour: the mean wage approach, opportunity cost approach, generalist approach and the specialist approach (see Budlender, 2004 for a detailed discussion on these approaches).

The mean wage approach involves taking the average wage, often of men and women separately, and assigning it to those providing care for the time they spend doing so. This is typically done at a national level, using the countrywide national average. Use of a national average in such a poor setting would attach a very high value to the labour and a recent local average was not available.

The opportunity cost approach estimates the cost of labour as what could have been earned. This approach has often been used in wealthier countries to estimate the value of forgone income associated with child bearing (see Davies et al, 2000 for example). Many of the caregivers in the sample were pensioners or unemployed, with little chance of getting employment. If the forgone income method or the opportunity cost approach had been used their labour would have been valued as zero. It could, however, be argued under the same approach that their labour does have a value in terms of the forgone time that could have been spent on other household activities or in leisure. While the opportunity cost approach does provide an argument for value, it does not, in this instance, provide a means of estimating it.

The generalist and specialist approaches are very similar. The generalist approach suggests labour should be valued at what an individual doing similar work in the market would be paid: for example, what a domestic worker might receive. The specialist approach uses the market wage of a person doing the same work. The pay of a cook or chef for time spent cooking, of a crèche worker for time spent playing with the children

and so on. The specialist approach tends to yield a higher estimated value of labour than the generalist approach (Budlender, 2004).

The generalist and specialist approaches seem to be possibilities for this study. Working through their application, however, highlights a number of difficulties. If an hourly wage were estimated using either method, there would still be the problem of how many hours to apply it to.

Arguably a time use survey approach could be used to estimate the time spent with the child. What counts as time with the child, however, is difficult to determine: it could be considered only dedicated time spent with the child or include time spent doing other activities but still keeping a watch. The joys of other people's children is that you get to give them back. A baby cries, you look for the mother; a crèche worker hands back the children at the end of the day. Taking responsibility for the care of a child is not equivalent to being employed to care for a child. A caregiver carries that responsibility even when the child is not present, or when the child is asleep or playing in front of them.

The caregivers at the cluster home take on similar responsibilities and they are paid. As mentioned previously, their pay is most likely an underestimate of the value of their time, but it does provide a benchmark. In addition to their pay they get free board and lodging but, as opposed to caregivers in individual households, they have an added burden of having to live away from their own homes. Although there are still limitations, the wage of the caregivers at the cluster home plus a small amount of the value of their board was used as a basis for valuing household labour. There still, however, remained one problem - economies of scale.

If one child enters a household and they are the only child there, they are likely to change the life of the caregiver dramatically. If, however, a second child joins, the burden is likely to increase less than when the first child arrived. Given such an argument, it would be inappropriate to value the time of a caregiver in an individual household with one child the same as the cluster home caregiver who has responsibility for six children. It is, however, also not valid to simply divide the wage of the cluster home caregiver by six and apply that to each individual household according to the number of children.

As no means of measuring the economies of scale related to time and responsibility were available, two methods were used for comparison. The first valued labour, per child, at one sixth the cluster home caregivers' wage regardless of the number of children. The second attached half the wage to the first child and increased at a constant rate for every other child. Although crude, the method does allow some examination of the impact of economies of scale on cost.

Having decided on a method, there still remains one issue worth raising: the value of the child to the home. Children themselves may bring value to the household, through contributions to household tasks or through the pleasure caregivers and other household

members may derive from having them around. Arguably these should be off set against the cost, particularly of labour. This, however, would be the beginning of a cost benefit analysis and the interest here is in examining the costs of provision of care. While not included, this issue should be kept in mind when considering the results.

THE OUTCOME MEASURES

The study required the selection of a few key measurable aspects of child development which could serve as outcome measures to determine the type and level of financial support which would make an observable difference to the quality of care of orphaned children, and hence impact on their psychosocial and cognitive development. There were two important considerations here.

Firstly, the factors under investigation interact in complex ways. The impact of the bereavement on the child's development depends in part on the child's experiences and in part on the quality of replacement care available to the child. The quality of replacement care is in turn dependent not only on household economic factors but also on aspects of household composition and functioning. The child's cognitive and psychosocial development is mediated by all these factors.

Secondly, many of the measures of child development in general use emanate from developed countries and are designed primarily to give sensitive accounts of child-rearing and child development in those contexts. Utilising them in very different cultural and economic contexts results in loss of focus and sensitivity. While there are various initiatives under way to develop indicators and measures suitable for South African conditions, there is no well-validated set appropriate for orphaned children in impoverished rural communities in South Africa, and indeed in other parts of Africa.

With these considerations in mind both qualitative and quantitative measures were selected on the basis that they would inform the debate on appropriate measures, and would provide a coherent account of the effects of different levels of support on the child's development. The assessments also made use of cultural interpretations of the data by trained observers from the same cultural background as the children and caregivers.

Narrative

Caregivers were interviewed using a semi-structured interview schedule designed to elicit accounts of how the orphans came to be with the caregiver, what changes this had meant in

their lives and how the child had reacted and settled. The interviewers were asked to follow up anything the caregiver told them that shed light on how the child was developing and being cared for, particularly anything to do with the child's social and emotional development. Such detailed data collection may be difficult on a large scale, it was, however, thought necessary to give insight into the various issues so as to better advise on what approaches may be replicable on a larger scale.

The interview was not to be conducted in front of the child. The guidelines given to the interviewer are contained in an appendix to this report.

Quality of care

The quality of care in the home environment was assessed using a modified version of the HOME inventory for middle childhood (Caldwell and Bradley, 2001). As outlined in the Manual, scores were assigned based on a combination of interview and observation in the home; the method itself has been adapted for a number of different cultural contexts (Bradley, Corwyn et al. 1996; Caldwell and Bradley 2001).

For this study item descriptions were altered in some cases to take account of the study environment. The interviewers/observers made two or more visits to the household in the course of data collection and discussed several aspects of care with the caregivers, giving them a reasonably comprehensive experience of the various parameters assessed in the HOME inventory.

Direct Observation

The HOME inventory was supplemented with two hours of direct observations on at least two different days. Family members were asked to continue with their normal activities and ignore the observer as far as possible. Observers recorded observations on a checklist every 20 seconds at the sound of a buzzer. The categories were: motor activity, emotional state, social interaction, vocalisation. Each of these were further broken down in to levels, details of which are contained in the appendix to this report.

Cognitive Tests

A series of cognitive tests were utilised to assess cognitive and educational potential and performance. As far as possible tests were chosen which had been used in other studies in similar communities, and were therefore known to be neither too easy nor too difficult.

Experienced test administrators tested children at home. Children were asked for their cooperation at the start of the testing and were thanked at the end. They were told that they had been very helpful. There were 5 different psycho-educational tasks

1. The Hopkins Verbal Learning Test

2. Digit span forwards

3. The Cancellation Task: a visual search task

4. The Construction Task: a spatial perception task

5. An arithmetic test based on the Wide Ranging Achievement Task but taking account of school curricula in KwaZulu-Natal.

The Hopkins Verbal Learning Test (Brandt 1991) is a 12-item list of words is read three times to the children and after each exposure the child is asked to recall as many words as possible from the list. After the third trial a list of 24 words is read and the child is asked to indicate whether the word was part of the original list. The test thus yields two scores – one for recall and one for recognition.

In the Digit Span Forward task the child was required to repeat sequences of numbers after the interviewer. The task commenced with two two-number sequences, and then the sequence length increased by one number. Once again, two sequences of equal length were presented before the length was increased; this process was repeated until the child was unable to recall either sequence correctly. The score was the length of the last sequence correctly recalled.

The stimulus material for the cancellation task was a sheet of paper with the letters A, B, C, D and E in computer-generated random sequences with the letter A over-represented. The children were asked to start from the top of the page and go line by line down the page making a pencil stroke through the letter A. It was stressed that they should do this as quickly as possible, which yielded scores for both speed and accuracy.

The construction task consisted of a sequence of shapes that could be made from small wooden sticks. The task required the child to match a template that was left exposed while the child attempted the task. The task was taken from the Kilifi Battery (Holding, 1997) and was based on similar construction tasks in the K-ABC test and reported in Rutter et al (1970). The child's representation of each template was scored for shape and for orientation.

The arithmetic test was composed of two parts – an oral test and a written test – and was designed to cope with the fact that children in the 5-10 age range typically move from a verbal understanding of numbers to using numeric symbols. Children who had not enrolled in school were given the oral section of the task. Children who attended Grades 1 and 2

were given 2 written examples first; if they could not complete them correctly they were given the oral test, but children who did correctly complete them were given the written test and credited with the oral score as well. Children above Grade 2 were credited with the oral test and given the written test. The child's level of numeric functioning was the sum of their scores on the oral and written test.

Birth dates were obtained from the children's birth certificates and the children were weighed and measured. The heights and weights converted to z-scores using the EPI-INFO vers. 3.2.2.

THE PILOT STUDY AREA

The pilot study took place in two rural towns and the surrounding countryside in a mountainous area of KwaZulu-Natal during the winter of 2004. The area has rainfall in summer and the winters are dry and cold, with snow at times. The area is close to a World Heritage Site and attracts tourists and holidaymakers who stay in hotels or bed-and-breakfast accommodation in the villages or on the nearby farms, or camp in the conservation area.

There are two small towns each of which consist of holiday homes, tourist accommodation and retirement homes, as well as low-cost housing provided by the municipalities to alleviate poverty. A Department of Health Clinic and Community Health Workers serve the area, and officers of the Department of Social Welfare, who handle grant applications for vulnerable children.

Two non-government organisations work directly with the effects of the AIDS epidemic: one is locally administered and has been established to support orphans and vulnerable children, and the other is part of a national organisation whose aim is prevention through working with young people.

The locally administered NGO runs a variety of programmes. These include a youth drop-in centre, a food parcel programme for vulnerable households particularly those with orphans and vulnerable children, support for home-based care and a cluster home for children who could not be cared for in the community. The cluster home is based on a property on the edge of one of the towns. The home is run by a group of caregivers who each take responsibility for a number of children in the household. Each of the children they take responsibility for is legally bound to them through a court placement. The long term plan for the home is to build cottages and for each women to have her own house and live there with the children she has responsibility for.

Outside the town the housing is scattered and the roads are bad. Food is scarce during winter. The families in the more remote parts of the study area have to travel 40-50 kilometres in local taxis to the town in order to attend the clinic or to obtain grants or pensions. Children walk long distances to school over rugged terrain, and many of the schools in the area are poorly equipped.

Figure 2: Mountainous terrain

The rural houses were usually constructed of wattle and daub. They are scattered across the countryside rather than grouped in villages.

Figure 3: individual homes

THE SAMPLE

In order to reduce variation due to climate, economic opportunities, cultural factors, and the geographical location of the homes, all orphan/caregiver dyads were chosen from a single area and community. Although homes were either in the villages or in the countryside and stretched across a 50 km tract of land in the foothills of the mountains, all of the caregivers used facilities in the villages from time to time: applications for grants and pensions had to be made in one of the villages, bulk food shopping took place there, and the clinic was situated there. 'Pension Day' when the grants were distributed in the village occurred once a month and was also the occasion for a market with produce and goods being bought and sold from temporary roadside stalls.

Within this community, orphan/caregiver dyads were recruited over a period of two weeks with the help of the NGO staff and community health workers, and by word of mouth from people living in the community. Children were recruited into the sample if they were between 5 and 9 years of age and, in most cases, if their mother had died and if their father had died or his whereabouts were unknown. There were two cases that did not exactly fit this description. In one, both the mother and father were criminals and had been jailed, but they had abandoned their children after their release from prison and it was not known whether they were still alive. In the other case the mother had died and the father had been the victim of a violent robbery and was severely incapacitated, unable to speak or contribute in any way to the care of the children. Effectively then all the children were double orphans, without the care of either of their biological parents.

In cases where there were siblings between the ages of 5 and 9 with the same caregiver, both children were recruited into the sample.

It was not possible to maintain an absolute distinction between models of care in the individual homes in the community. The interviewers found few Child Care grant holders; in some cases where the mother had been the grantee for a Child Care grant, in the confusion since her death no arrangement had been made to transfer the grant to the caregiver or to apply for the foster parent grant. In other cases, grant applications were being processed and the families were on the NGO list for food parcels, but the distribution agent had not delivered the food parcel. In view of this, any child whose caregiver was not receiving the foster parent grant was classified as belonging in a 'minimal support' group for analysis purposes.

The sample was designed initially to consider three models of care. It is important to note that the three models were not alternatives. All three types of provision are useful for different support requirements:

1. Early response to support the children when the parents become too ill to provide support and, immediately after the bereavement, for the potential foster caregiver while investigations into their suitability are proceeding.

2. A more long term solution in foster care grants.

3. A care-giving arrangement for extreme cases not easily cared for in the extended family or the community.

ANALYSIS OF PILOT STUDY DATA

The qualitative descriptions were analysed using NVivo software to extract themes. During the course of this analysis it became clear that many of the children and their caregivers were experiencing problems that might have a serious effect on the child's development. The problems were diverse and as such would not lend themselves to a more structured analysis, but needed to be set out as a framework through which the quantitative analysis could be interpreted. In particular the caregiver-child dyads who formed the small foster care grant group were burdened with a high proportion of serious problems. This cast doubt on the validity of viewing this group as an intermediate group between the minimal financial support group and the high financial support care group in cluster care, and led us to consider the models as primarily falling into two categories: community and cluster. The qualitative analysis also indicated that the cluster care was not simply an alternative care choice but catered for children who for one reason or another were not easy to place in family homes in the community.

A four-level approach was taken in the analysis of the outcome measures. At the simplest level descriptive data and the internal consistency of the measures were assessed to determine the appropriateness of the measure for the study population. The second level of the analysis dealt with validity, the extent to which the measures could be validated against other measures on the same children. The third level of the analysis was to examine the sensitivity of the measures in detecting group differences. Finally the measures were entered into predictive models to test their ability to apportion the variance to particular factors in the model.

With respect to the univariate and multi-variant analysis we adopted two strategies to identify the determinants of performance:

1. In order to examine the impact of the models of care (cluster home versus individual homes) on behaviour or individual test performance, these models

and gender were entered into a loglinear model with age in months as a covariate.

2. In order to examine the impact of the three major categories of influence on behaviour or test performance (home environment, income and nutritional status) in the individual homes the contribution of each measure in the category was assessed separately in a regression analysis along with the child's age. The best predictor in each category was entered into a backward regression in order to progressively eliminate the categories with the least influence.

PILOT STUDY RESULTS

As mentioned in the introduction, the purpose of the pilot study was to examine the potential uses of the methods outlined above. The sample for the pilot was small and confined to a particular geographical area. It is not possible, therefore, to generalise the results presented here as the study was not designed for such a purpose. The pilot study should rather be considered, as was intended, as a basis for discussions relating to the methods proposed.

SAMPLE CHARACTERISTICS

Table 1: Children, families and households

Total number of children	34
Male	18
Female	16
Mean age in months	89.
Range	63-120
Children living with community caregivers	26
Living in cluster home	8
Living with siblings	
Only children	9
Living with all siblings	20
Living with some siblings	3
Living apart from siblings	2
Community caregivers with orphans	21
Great grandmother	1
Grandmother	8
Aunt	9
Sister	2
Other	1

ABSORBING ORPHANS INTO THE INDIVIDUAL OR THE CLUSTER HOME

Moving to their present home

The majority of children in individual homes were staying with the caregiver when the mother died (18) or came to stay immediately after (4). Most of the cluster home children only came to the cluster home later (7) usually after traumatic circumstances. The only cluster home child who came before his mother's death had been seriously ill at the time, and his mother was said to be mentally disturbed.

None of the cluster home caregivers were relatives of the sample children, but all of the children in individual homes were being cared for by female relatives, with the exception of one woman who was caring for children from her husband's liaison with another woman who had died.

Seven of the caregivers were already the main caregiver for the children when the mother died, so there were no major changes in the child's circumstances after the mother's death. A further seven said they had offered to take over as caregiver to the child, and five were chosen by the extended family to care for the child. In most instances it was not clear whether the caregiver had any choice in the matter, and sometimes it was obvious that the caregiver had very little choice. In one case, the seriously ill mother had requested that the caregiver should look after her children, and in another the only possible alternative caregiver was known to be a drunkard. In the cluster home sample, five of the eight children had been placed there at the request of a social worker and the remaining children were there because no family caregiver had been found.

The burden of care

Only ten of the community caregivers received help from other members of their families. The help given was clothes for the child or money.

For the most part both the community caregivers and the cluster home caregivers said that the children were well-behaved and helpful, performing a number of useful functions in the household, and that they got on well with other children in the family. Exceptions to this were three children who were too young to participate in chores, a child who refused to wash dishes and punished by the other children for this, and a child at the cluster home who had severe behaviour problems. Two of the children had older siblings who were difficult to care for because they absconded: one an older boy who had a history of going off by himself even before the parents died and was unhelpful in the home, and the other was a girl who was sexually active.

On the positive side, two children who had shown signs of distress when they had first come to their respective caregivers had settled and improved, becoming happy, laughing and playful.

From the caregivers comments it would appear that most children from the sample in this age range assist with household chores on a daily basis and do this willingly. They fetch wood and water for the household, run errands to the shop, wash clothes, clean the house and look after younger children. The cluster home children help in the garden at weekends. This use of children to assist with the running of the household almost certainly helps the individual households to assimilate the children, and statements such as, "He is just part of the family", or "We get on well as a family" emphasise that most caregivers in the study do not appear to distinguish between the orphans and other children in the family.

How the child had settled in

When asked how the child was faring at school, most caregivers reported that the child was doing well, with only five caregivers indicating that there were problems. There were two sets of twins in the sample and in both cases one twin was coping well at school whereas the other was amongst the five said to be having problems. Several caregivers made a distinction between the child's performance at numeracy tasks (counting and maths) and the rest of their school performance, and two caregivers mentioned that members of the family were teaching the children.

At this young age many of the children spend most of their after-school hours with the caregiver. This was the case with seventeen of the individual households, although three mentioned other family members as well. Two spent most of their time with friends and the remainder had a favourite family member as a main companion. In the cluster home the children spent most time with their caregiver and the other children in their group.

Almost all the children had friends of the same gender and much the same age, some preferring to play with groups of children and others with a 'best friend'. Among the activities with friends, boys played ball games (soccer or marbles), rode a bicycle, trapped field mice, played cars with an old scrap car or home-made wire cars. Both boys and girls sang songs (gospel songs and songs from the radio), chanted rhymes and danced traditional dances. Girls played ball games, played with dolls and pretended to be cooking. Most were talkative, talking about school and friends, food, TV programmes, bible stories, and telling jokes, although two of the boys were said to be quiet; "He is a child who does not love talking". One child had a speech problem and was taken to a therapist and is now said to be much better, although not entirely cured. One of the cluster home children was mute for a while when she was first brought to the Home by a social worker, but now talks.

Death and bereavement

Some of the children were too young when their mother died to react to her death, even when they were told about it or were included in the funeral ceremonies. The caregivers had explained the absence of the parents in different ways: some shielded the children from the knowledge (in two extreme cases by denial and by pretending to be the child's mother) and others adopted a more modern approach of including the children in the funeral ceremonies, and of letting them see the body laid out in the house. The children themselves reacted in different ways: the younger ones seemingly unaffected; others were sad and uncomprehending; and one later refused to believe that her mother was dead, saying that she was working far away. Some of the children who were older when their mothers died were very upset. The caregivers and their families did their best to console the children who cried a lot. In one case members of the church assisted. An older sibling of one of the children was said to have become 'mentally disturbed' by the death of the parent and in this instance the caregiver had asked for assistance from a social worker.

When asked if the children talked about their parents, most (16) individual caregivers said that the children never did. Two of the individual caregivers tried to keep the children's memory of their parents alive by talking to them about the parents and taking them to visit their old home, but most did not remind the children of their parents unless they asked. The cluster home caregivers, on the other hand, tried to keep the children in touch with their families, but in the case of the abused children this was not advisable, and the children themselves refused.

Behaviour problems

The interviewers attempted to find out whether the children were experiencing emotional problems, whether they were withdrawn and quiet or 'acting out', difficult and aggressive. Without exception the caregivers said that the children were basically happy: they told jokes, sang, laughed, played, chatted, asked questions, and seldom cried. The cluster home caregivers reported seeing a marked change in the children since their arrival, they had become playful and gregarious. Two community care children were reported as being somewhat over anxious about illness and death, and several of the cluster home children were anxious or disturbed when they first arrived at the Home (see Problems, below) and although improved, some problems remained. There was one exception to this: a child in the cluster home who seemed disturbed and in need of professional help. Caregivers did not report anything other than mild naughtiness, which they punished either by scolding or by smacking the child's hand with a small stick ('like at school'). Some children became angry and defiant at times, usually when playing or interacting with other children, or when told to do something they did not want to do, but the episodes were infrequent and of short duration. Overall, the caregivers did not report any serious behaviour problems, apart from the aforementioned cluster home child.

GENERAL PROBLEMS

Despite the generally positive response given by the caregivers during the interviews, observers noted that many orphans, caregivers and their families were experiencing problems. The general problems experienced by most community caregivers was accessing assistance:

1. People don't know the right channels when applying for grants or assistance.

2. People complain that the social workers send them back and forth, saying 'come tomorrow' and they can't afford the transport and have a lot to do looking after the children.

3. The food parcel delivery system is not good. Food parcels don't always get to the right people. They are left at a central household in an area, and sometimes those people don't send word that the food has arrived.

In addition to this, a high proportion of orphans had experienced severe problems of one sort or another. Of the eight children in the cluster home group, five had severe problems when they first came to the home, although there has been an improvement in most cases:

- One of the twins is very disturbed: early sexual behaviour, stealing and aggression.

- One child is a bed wetter and severely stunted.

- One sibling has no bladder control, the other had a behaviour problem

- One child had diarrhoea and kwashiorkor when he came to the cluster home.

Of the eight caregivers receiving the Foster Parent Grant for the children in our sample, the interviewers noted that five caregivers were experiencing difficulties in coping with the care of the child:

- The caregiver had her own 8 children, and also looked after the sick mother before she died. The orphan was, in the interviewer's opinion, unsupervised, dirty and neglected and was given poor quality food to eat.

- The child was HIV positive, as was the caregiver and an uncle. The child was severely wasted and died two months after the completion of the data collection.

- The child is severely stunted. The caregiver's sister receives the grant but does not contribute to the child's care. The caregiver told the interviewer that she (the caregiver) has quite severe psychological problems.

- The caregiver told the interviewer that she has too many children to look after, and that she had looked after the child's sick mother until she died.

- The caregiver left school to look after her young siblings.

Of the sixteen children in families with minimal support, interviewers reported problems for eight of the children.

- After her mother's death the child was first taken in by a family member who was an alcoholic, and who used to beat the child. When other members of the family realised what was happening they arranged a different caregiver for her, and she is now a happier child.

- The child was abnormally frightened of strangers.

- In three of the households the children had no adult supervision during at least one of the interviewer visits.

- Two siblings went to the same household but the older brother (aged 14) has absconded.

- The caregiver complained that she now had three additional children to maintain. The children were unsupervised on occasions, and the child included in the study was severely stunted.

- The caregiver had to look after the child from birth as well as his sick mother. The caregiver is now sick and can hardly stand, and can't afford treatment. The child is severely stunted.

THE QUALITY OF CARE

Level 1 Analysis: Descriptive

One of the methodological aims of this research was to find an adequate and appropriate measure of the quality of care in the homes. The first step in this process was to test the internal consistency of the subscales of the adapted HOME Inventory. Five of the subscales yielded Cronbach's alpha scores above .5 (see Table 2) and the remaining three subscales (Integrity of the family, Emotional climate in the home, and the Physical environment) were eliminated from further analysis on the basis that the items that made up the scores on these subscales did not consistently describe that aspect of the home environments.

Table 2: Internal consistency of the sub-scales of the HOME Inventory

Scale	Cronbach's Alpha
Responsivity	.6637
Encouragement of maturity	.5302
Learning	.5200
Enrichment	.8086
Companionship	.5372

Combining the Responsivity and Encouragement of Maturity scales yielded an alpha of .7753, indicating that these two scales could be combined.

Level 2 analysis: Construct validity

The second step in examining the adequacy of the HOME Inventory was to analyse the association between the short-listed subscales and the child measures. Generally speaking, the quality of care as measured by the short-listed subscales of the HOME Inventory was associated with aspects of the child's performance on cognitive tests, nutritional status, and spontaneous behaviour (see Table 3), lending credence to their value as indicators of the care available to the child in the home.

Table 3: Pearson correlations between HOME Inventory subscales and child measures (with p-values in parentheses).

Short-listed HOME INVENTORY Subscales

	Responsivity	Encourage Maturity	Learning	Enrichment	Company
Hopkins Verbal Learning n=34					
Recall	.440 (.009)	.352 (.041)	ns	Ns	ns
Discriminant Recognition	.553 (.001)	.451 (.007)	ns	Ns	ns
Numeracy n=34					
Digit Span Forward	.484 (.004)	Ns	.463 (.006)	Ns	ns
Anthropometry n=32					
Weight Z-score	.378 (.033)	.37 (.034)	.542 (.001)	.347 (.052)	ns
Weight for Height z-score	ns	.377 (.034)	.430 (.014)	.364. (.041)	ns
Direct Observation n=34					
Energetic activity	ns	Ns	-.354 (.054)	Ns	ns
Mobile	ns	Ns	-.333 (.054)	Ns	ns
Stationary (but occupied)	ns	Ns	.423 (.013)	Ns	ns
Cooperative activity	ns	Ns	ns	Ns	.367 (.033)
Onlooker	ns	Ns	.408 (.016)	.349 (.043)	ns

Ns: Not statistically significant, p>.05

Level 3 analysis: The sensitivity of the measures to group differences

In this analysis the average standard of care in the cluster home was compared with the average standard of care in the individual homes. The quality of care as measured by the 5 subscales of the HOME Inventory was significantly higher in the cluster home (MANOVA F=5.985 Wilks' Lambda p<.001). The main differences between the quality of care in the two environments were captured in the Learning Opportunities and Enrichment scales (Adjusted R Squared .444 and .429 respectively).

Table 4: Mean (standard deviations) of sub-scale scores on the HOME Inventory for different types of orphan care.

HOME scale	Cluster home	Individual homes
Responsivity*	8.3 (.750)	6.4 (.416)
Maturity*	6.5 (.472)	5.0 (.262)
Learning Opportunities***	5.5 (.476)	2.7 (.264)
Enrichment***	5.8 (.639)	2.0 (.354)
Company**	3.0 (.486)	1.4 (.269)

*	p<.05
**	p<.01
***	p<.001

There were no significant differences between the two individual home groups (Foster Care Grant vs Minimal Support) with respect to the HOME sub-scales using either a parametric or a non-parametric MANOVA.

ANTHROPOMETRY

Level 3 analysis: The sensitivity of the measures to group differences

As expected in this environment, there was considerable evidence of poor nutrition. There were no significant differences between the two individual home groups with respect to height for age, weight for age, or weight for height z-scores, but the children in the cluster home were better nourished than those in individual community homes. The nutritional status of the cluster home children was better with respect to weight for age and weight for height, indicating better nutrition in this setting in the short term. There were no significant differences in height for age, reflecting early nutritional disadvantage in both groups.

Table 5: Mean (standard deviations) of children's heights and weights expressed as z-scores

Nutritional indicator	Cluster home	Individual homes
Height for age z-score	-.740 (1.079)	-.969 (.907)
Weight for age z-score*	-.186 (.789)	-.951 (.529)
Weight for height z-score**	.551 (.766)	-.258 (.680)

* $t=3.12$, $p=.004$

** $t=2.83$. $p=.008$

COGNITIVE TASKS

The cognitive tasks had all been used previously on other studies in rural areas of KwaZulu-Natal and were known to be appropriate for children in the first few grades of school. It was, however, relevant to determine whether they would be appropriate and sensitive measures of group differences.

Level 1 and level 3 analysis: Description and sensitivity of the tasks to group differences

The cluster home children were sent to the best available school in the area and were assisted with their school assignments after school hours by volunteer tutors. The community home children were sent to the school closest to their home and probably did not have the same level of tutoring at home. The cluster home children were younger on average (88 months) than the individual home children (92 months). Despite this, the analysis showed that they averaged higher scores on all of the cognitive tests and were quicker on the time-based cancellation task, although the only statistically significant difference on a simple t-test was on the Digit Span Forward memory task (See Table 6).

Table 6: Comparison of mean (standard deviation) scores on cognitive tasks in different models of care.

Cognitive task	Cluster home N=8 Score mean (std dev.)	Individual homes N=26 Score mean (std dev.)	Statistical signficance
Digit span forward	5.25 (.886)	3.65 (1.265)	T=3.9, df=17.62, p<.001
Arithmetic	19.38 (8.585)	17.81 (9.191)	
Construction task	9.00 (6.480)	5.77 (6.414)	
Hopkins Verbal Learning: Recall	16.25 (5.701)	14.73 (4.854)	
Hopkins Verbal Learning: Discriminant recognition	9.75 (1.909)	7.73 (4.220)	
Cancellation task score	18.38 ((0.996)	17.80 (3.205)	
Cancellation task time	69.88 (24.228)	78.00 (3.205)	

Level 4 analysis: Predictive models

In recognition of the fact that many of the cognitive measures dealt with related skills or behaviours, we first utilised a multivariate approach to identify the main determinants of performance.

In order to assess the association of the care environment and the home income in individual homes, the scores on the cognitive tests were entered into a multivariate analysis as dependent variables with age, the HOME score on Responsivity to the child, and the per

capita income in the household as covariates. The best model showed significant associations between the scores on the arithmetic test, the construction task and the two Hopkins Verbal Learning measures, recall and discriminant recognition. Child age, more responsive caregiving and a higher household income were all significantly associated with better cognitive performance (MANOVA Age in months: Wilks Lambda F=9.874, df=4 p=<.001, Responsivity: Wilks Lambda F=2.919, df=4, p=.050, Per Capita Income F=3.441, df=4, p=.030).

Arithmetic test

Level 1 Analysis: Descriptive

The performance of children in this study on the arithmetic test compared favourably with the general standards in the Zulu-speaking rural schools in KwaZulu-Natal -based on the results of 919 learners in the first four grades of 48 randomly chosen schools in the southern part of the province. They achieved on average 2.5 points higher (8%) on an arithmetic test with a total score of 32 than rural KZN children in the previous study when the means were adjusted for age in both cases.

Level 3 analysis: The sensitivity of the measures to group differences

The cluster home children (n=8) are taken by bus to the school thought to be the best in the area, and they averaged 4.4 points higher (14%) as compared with 2.0 points higher (6%) for the community children (n=24), but the difference was not statistically significant.

Level 4 analysis: Predictive models

Higher per capita household income was significantly correlated with age adjusted arithmetic scores for the children in community households (n=24 Pearson coefficient= .552 p=.004).

Construction Task

Level 1 Analysis: Descriptive

The construction task drew on visual perceptual skills. The test presented difficulties to many of the children in this study and 10 of the children could not do it at all: nine community children and one of the cluster home children.

Level 4 analysis: Predictive models

In regression models, which included the age of the child, measures of the HOME environment, nutritional status and household income, only the age of the child was a significant predictor of performance on this task (df=22, F=4.914, p=.038)

The Hopkins Verbal Learning Test

Level 4 analysis: Predictive models

There are two main measures associated with the Hopkins Verbal Learning Test: recall and discriminant recognition. The recall measure simply reflects the total number of words spontaneously recalled from a list presented three times. Discriminant recognition refers to the number of words a child correctly recognises after the number of words wrongly identified has been subtracted from the total. The regression model, containing a measure of the HOME environment (combined Responsivity and Encouragement of Maturity), per capita income and the age of the child, was statistically significant for both measures, with the addition of a nutritional indicator in the case of the discriminant recognition (see table 7).

Table 7: Predictors of performance scores on the Hopkins Verbal Learning Test

Measure	Predictor variables	df		p
Recall	Model	3, 19, 22	F=4.184	.020
	Age in months		T=2.095	.050
	HOME combined responsivity and maturity scale		T=2.406	.026
	Per Capita Income		T=1808	.086
Discriminant recognition	Model	4, 18, 22	F=5.244	.006
	Age in months		T=1.473	.158
	HOME combined responsivity and maturity scale		T=3.741	.001
	Weight z-score		T=2.010	060
	Per Capita Income		T=2.213	.040

Digit span forward

Like the previous task, this task was designed to assess the information processing and memory skills fundamental to cognitive function.

Level 3 analysis: The sensitivity of the measures to group differences

In the general linear model neither age nor gender were significant but the effect of the type of care (cluster home or individual home) was. Cluster home children had significantly higher scores on this task (F=10.793, p=.003).

Level 4 analysis: Predictive models

The HOME scale denoting a stimulating environment was the only variable that was significant in the regression model (df=1,29 T=3.085, p=.004).

Cancellation Task

This was a visual search task based on finding the letter A in a page of letters of the alphabet, arranged in lines across the page. There were two measures: speed and accuracy. The accuracy measure was not related to any of the variables under consideration.

Level 3 analysis: The sensitivity of the measures to group differences

In the general linear model, gender was not significant but a model with age and type of care was significant (df=2, 33 F=6.024 p=.006). As with the Digit Span Forward, cluster home children had higher scores on this task, but the difference did not reach statistical significance.

Level 4 analysis: Predictive models

In the regression analysis, the speed of processing was associated with the child's age, the HOME Enrichment score, the height z-score and the family's income. There was, however, considerable collinearity between variables (HOME Enrichment, height z-score and income were correlated), and ultimately the best model showed significant effects of age and income (Model: F=10.612, p-.002; Age: t=-4.408, p=.001; AE income: t=-2.174, p=.047).

Summary of findings on the Cognitive measures

For the most part, the cluster home children had higher scores on these tasks. The background information on the care and education available to them suggests that their better cognitive performance can be ascribed to their schooling, after school care, nutrition, and their stimulating and enriching environment. Ultimately the financial resources

available to the institution and the generally well-organised caregiving make these lifestyle factors possible. The fact that the children regularly interact with adults in the after school care programme means that they are more accustomed to answering cognitively demanding questions put to them by adults.

For the children in individual homes, higher scores on cognitive tests (when adjusted for age) were generally associated with higher per capita income, more caregiver responsivity to the child, a more stimulating home environment and better nutrition.

MEASURES OF BEHAVIOUR

There were no significant differences between the cluster home children and the individual home children on any of the measures.

Table 8: Comparison of Cluster home and individual home children in terms of the mean and standard deviation of percentage time spent in different behaviours

Behaviour	Cluster home % n=8	Individual home % n=26
Emotional state		
Overtly Positive	8.0 (5.3)	8.2 (10.4)
Overtly Negative	0	0.6 (2.6)
Activity level		
Energetic	17.2 (16.1)	17.3 (16.6)
Mobile	16.6 (10.3)	20.1 (11.8)
Stationary	66.2 (15.6)	61.2 (24.2)
Immobile	0	1.4 (5.1)
Social behaviour		
Co-operative	6.1 (11.0)	9.7 (15.7)
All social	82.2 (27.4)	80.9 (22.3)
All involvement in verbal	23.3 (16.2)	21.9 (12.9)

interchanges		
Solitary	11.3 (14.6)	18.1 (21.1)

Emotional state

Level 4 analysis: Predictive models

In the regression analysis, the amount of time spent in overt displays of pleasure (smiling, laughing) showed moderate association with a number of background factors: the HOME sub-scale scores for Emotional Climate, Responsivity and Encouragement of Maturity, the nutritional status measure weight for height z-score, and the income measure AE income. All of these were inter-correlated and a backward regression suggested that the best model for children in individual homes, and one that was close to statistical significance, was the nutritional measure (weight for height z-score: t=2.023, p=.056). Neither gender nor the model of care was associated with this measure.

The converse emotional state concerns the amount of time the child was observed to be showing overt signs of unhappiness (frowning, pouting, crying). None of the variables in either the regression model or the logistical regression were significantly associated with these signs of unhappiness.

Activity level

Level 4 analysis: Predictive models

Energetic activity was defined as more energy expenditure than is necessary to complete a task. Under this definition, activities such as running, skipping, and jumping backwards would be defined as Energetic, but walking would be defined as Mobile. The best regression model for energetic activity in individual homes contained the HOME score for Encouragement of Maturity and the Per Capita Expenditure of the family as predictors of the amount of Energetic behaviour, but of these only the expenditure was statistically significant (Model: df 2,22, F=6.017, p=.020; Home maturity: t=1.902, p=.072; Per Capita Expenditure: t=3.402. p=.003.)

Higher levels of all activity (Energetic plus Mobile) were best predicted by the HOME measure for learning, the child's nutritional status as measured by weight for height z-score, and the household per capita expenditure. (Model: df=3,19, F=6.313, p=.004; HOME learning: T=-2.819, p=.011; Weight for height: T=1.823, p=.084; Per Capita Expenditure: T=1.972, p=.063).

The relationship between the HOME Learning sub-scale score and activity was negative, suggesting that children who spend more time in doing household chores displayed higher levels of activity than children in households that placed more emphasis on academic learning.

The only strong predictor for Immobility was the HOME score of Emotional climate, which was negatively associated with the amount of time spent immobile (Model: df=1,22, F=14.609, p=.001).

Sociability

It was our impression, from the qualitative information and from the observations, that most children spent some of their out-of-school time each day in doing household chores and that these formed the major part of the Co-operative Behaviour category.

Level 4 analysis: Predictive models

None of the factors in the regression model were significant predictors of the amount of cooperative behaviour displayed by children in the study. Similarly, none of the factors in the regression model were significant predictors of the overall amount of social behaviour displayed by the community children.

Summary of Behaviour results

The main value of the direct observational results was in the overall picture obtained of life for the children in the study. Observation times were confined for the most part to afternoon activities after school. In terms of activity levels, overt emotional states, and social activity there were few systematic differences between the cluster home children and those in the individual community homes.

Various HOME inventory scores were predictors of different behaviours:

- Encouragement of maturity meant that the children spent more time in household chores and therefore in cooperative behaviour.

- More attention to a learning environment meant that the children spent less time in active pursuits.

- A low score on Emotional Climate was associated with time spent Immobile, doing nothing at all, rarely observed in children of this age and a possible indicator of emotional disturbance.

Better nutritional status, as measured by the weight for height z-scores, predicted more overt expression of pleasure and more activity. The fact that the income and expenditure measures were similarly significant predictors of emotional state and activity levels suggests that in the sample there is an association between these two factors and that higher levels of household income make a difference to the amount and quality of food available to the children and hence to their energy levels and feeling of well-being.

A summary of the outcome measures, as used in the pilot study, is presented in the following table. The table shows the range of possible measures used in the pilot study and begins to highlight the possibilities for the use of these measures in evaluations by comparing the results across models.

MEASURE	DIFFERENCE BETWEEN CLUSTER HOME (CH) AND INDIVIDUAL HOMES (IH)	PERFORMANCE PREDICTORS IN THE INDIVIDUAL HOMES
Problems	There were indications of more severe psychological problems in the cluster home children as compared with the individual home children, but most problems had diminished.	More than half the children and/or their caregivers were experiencing problems likely to impact on the child's development. Main issues: HIV infections, caregiver unable or unwilling to cope with additional children, children unsupervised, older siblings absconded, child beaten, nutritional deficits, grant being spent on other people, untreated speech problem.
HOME inventory There were significantly better mean scores on some of the sub-scales for the cluster home.	Responsivity — CH = 83%, IH = 64 Encouragement of Maturity - CH = 93%, IH =71% Learning Opportunities - CH = 69%, IH = 34% Enrichment — CH = 73%, IH = 25% Company — CH = 50%, IH = 23%	
Cognitive tasks Note: all cognitive scores adjusted for age in the analysis.	The cluster home children performed better than individual home children on most of these tasks	Higher scores generally associated with age, higher per capita income, more responsivity and stimulation in the home, and better nutrition
Arithmetic	Cluster home children 14% higher than comparison group and individual home children 6% higher.	Higher per capita income.
Construction task	More cluster home children able to do the task CH = 87%, IH = 65%	Only age was a significant predictor of score
Hopkins Verbal Learning Recall	ns*	Responsivity and Encouragement of Maturity in the HOME, per capita income and the age of the child
Hopkins Verbal Learning	Ns	Responsivity and Encouragement of Maturity in the

MEASURE	DIFFERENCE BETWEEN CLUSTER HOME (CH) AND INDIVIDUAL HOMES (IH)	PERFORMANCE PREDICTORS IN THE INDIVIDUAL HOMES
Recognition		HOME, per capita income and the age of the child, as well as weight z-score.
Digit span forwards	Cluster home children had higher scores	Enrichment in the HOME.
Cancellation task: speed	Individual variables did not reach significance, but a model with age as a covariate and type of care as a main effect was significant	Age and per capita income.
Cancellation task: accuracy	Ns	Ns
Nutrition	The cluster home children had significantly better weight for age and weight for height z-scores (EPI Info: mean=0, std dev=1)	
	Weight for age z-score: CH = -.186, IH = -.951	
	Weight for height z-score: CH = .551, IH =-.258	
Direct Observation	The mean percentage of time spent in each category of behaviour did not differ significantly at the 5% level between the CH and the IH	
Emotional state: positive	CH = 8%, IH = 8%, range: 0-37%	Weight for height z-score
Emotional state: negative	CH = 0%, IH = 1%, range: 0-13%	Ns
Activity level: energetic	CH = 17%, IH = 17%, range: 0-60%	Encouragement of Maturity and per capita expenditure
Activity level: all mobility	CH = 34%, IH = 37%, range: 06-93%	Positive associations with weight for height z-score and per capita expenditure and negative associations with a Learning Environment.

MEASURE	DIFFERENCE BETWEEN CLUSTER HOME (CH) AND INDIVIDUAL HOMES (IH)	PERFORMANCE PREDICTORS IN THE INDIVIDUAL HOMES
Activity level: immobile	CH = 0%, IH = 1%, range 0-20%	Negative association with the Emotional Climate in the HOME
Cooperative behaviour	CH = 6%, IH = 10%, 0-66%	Ns
All social interaction	CH = 82%, IH = 81%, 18-100%	Ns

COSTING RESULTS

The above discussion and summary of results show some possibilities for comparisons across different models of care. It would seam, from the above, that the children in the cluster home are performing better in terms of education and are better nourished. The analysis also provides some insight into what the causes of variation within the community care group are, highlighting the importance of different aspects of the home environment, the significance of better nutritional status and at times the role of higher household income. This information alone would be useful to policy makers in considering which models or types of models should be expanded as the crisis deepens. They may consider the cluster home to be a good option, as the children appear to be doing fairly well. If, however, the cluster home is found to be far more expensive than the community based models they may not be able to afford to expand it. This is where the added consideration of costs needs to be combined with the outcome measures. The following section examines the results of the costing, which once determined can be combined with the outcome measures to provide more meaningful input to the decision making process.

Cluster home

Based on the financial records of the cluster home, the average cost per child per month is R950. This reflects the expenditures on the household and on the child's education. A little over 70% of the financial costs are related to costs of running the home itself. The largest cost items within the home relate to consumables, mainly food and salaries of the caregivers. The remaining 30% of financial costs are related to the children's education. These costs are made up primarily of school fees; though there were significant costs associated with transporting the children to and from school and providing them with stationery and uniforms.

As discussed earlier, the financial costs form only part of the total costs of running such a service. Many items are donated to the home and a number of people give their services with no charge. While these resources do not cost the home anything, they could have been used elsewhere. As our interest is in the use of resources by society and not simpley the cost of them to a single organisation, consideration has to be given to the value of donated goods and services.

The largest single donated item is the property itself. The house and the land are the property of the NGO that runs the home as a result of an international donation. Based on the value of the property, the size of the house and local rental values a cost per month of the property was estimated.

The most important donation in terms of monetary value, however, is the donated time of a number of individuals who assist with the running of the NGO, the home itself and some of whom assist directly in the provision of care, particularly in regard to assisting with school work. Once all donated items are included the estimated value of donated labour accounts for 25% of total costs.

The value of the donated labour in the results includes only estimates of the value of the time spent by unpaid volunteers. There is, however, an element of volunteerism and donation in the work done by the paid staff. The salaries paid are very low and the work load is high. The staff undertake their work not simply for the pay, but as a service to the community. To be precise in the valuation of the resources used, the salaries of the staff should be inflated to a market-related level. There is, however, no easy basis for this inflation and the salaries are, therefore, left unchanged. It should, however, be kept in mind that this omission undervalues the value of the time spent by staff.

In addition to labour and property, a considerable number of material donations are made by various individuals and organisations. A list of these is kept by the home but not to a level of detail to accurately estimate their value. A rough estimate was made and is included in the estimate of total costs.

The following table presents the results of the costing of the cluster home. Both the financial and economic costs are given to reflect the relative importance of donated items.

Table 9:   Cost break down of cluster home

	Financial	Economic
Household expenses	73%	46%
Education expenditures	27%	17%
Donated accommodation	-	5%
Donated labour	-	26%
Donated goods	-	6%
Total per child per month	R950	R1300

The inclusion of resources used, but not paid for by the organisation, increases the costs to R1300 per child per month. This increase is a result mainly of the high value of donated labour.

Individual homes

The costing of caring for children in the individual homes is a more difficult exercise, as discussed previously in the methods section. Households do not keep detailed financial records and audited accounts. More importantly, they have functions, and therefore costs, that are independent of the child's or children's care. The cluster home exists to provide care and all the costs related to the house are, therefore, part of the costs of care. The individual households, however, existed before the orphan child was present and have functions that do not relate to their care.

Respondents were asked what the total expenditure of the household was the previous month and what the expenditure was on a number of different items. For each item, respondents were asked if the children in the household used or consumed the item, if the item was only for the children, or if it was shared by the entire household. There were very few instances where items were identified as being for only the child or only adults. This result was expected, given that the households were extremely poor and the bulk of spending was on necessities, mainly food. On average, 77% (44-100%) of expenditure in the households sampled was on food items.

As discussed previously, allocating expenditures to children within the household is difficult. It was decided to use weights to balance child consumption against adult. As it was not clear what weight would be appropriate, two extremes were used. Expenditure within the household was divided between members on the basis of a 0.3:1 child: adult consumption weight on the one end and a 0.7:1 on the other; items that were consumed only by adults were excluded from the total.

Based on the above weights, expenditure on children was estimated to range between R23 and R300. The average estimate with the 0.3:1 weight was R71 and R115 with the 0.7:1. These two averages will be used in the costing.

As with the cluster home, account needs also to be taken of items consumed but not paid for. A number of the households in the sample received food parcels, while some received material support from family and friends; there was also limited agricultural activity. A number of households also received grants; these involve administration and delivery, which also represents a cost. The estimates of the value of these donated items ranged from zero in households that received none to R300 in others. Once adjustments for household size and composition are made, assuming that donated items are shared the same as purchased goods, this range changes to 0-R20 per child.

Children do not only make use of consumables in the household. They also take up space within the home, which presents another cost. Based on the even distribution of household costs and given the size and type of housing, the value of this consumption of space is estimated to be between R20-30 per month.

Children further cost the household in terms of supervision and the acceptance of responsibility. This, as has been discussed already, is the most difficult aspect of the care to cost. If it is assumed that there are no economies of scale and that the value of the women providing care is similar to that of the women in the cluster home, then the labour cost per child per month is R200. If, however, it is assumed that half of the labour costs occur for the first child and thereafter increase at a constant rate, the average cost per child of the labour in individual households increases to R220.

The results discussed above are summarised in the following table.

Table 10: Cost per month of caring for children in the individual households

	Low estimate	High estimate
Expenditure on child	R71	R115
Donated items	R0	R20
Accommodation	R20	R30
Labour	R200	R220
Total per child per month	R291	R385

It should be made clear that the costs presented above are not an indication of what it 'should' cost, but rather an estimate of what it is currently costing households. While the cost of care in the individual households is far lower than in the cluster home, the results need to be considered in light of the differential outcomes.

DISCUSSION

The costing of the different models shows, as would be expected, that the cluster home is substantially more expensive than the community-based care. As was the case with the outcome measures, examining the costs in isolation is inappropriate. The results when considered alone may be interpreted to show the efficiency of community-based models. This, however, cannot be so easily determined. What the costing shows is that the 'care in the community' model is far cheaper. Determining relative efficiency requires a consideration of outcomes.

The experience from the USAID draft report 'Understanding the needs of orphans and other children affected by HIV and AIDS in Africa: state of the science' (April 2004) points to four categories of evidence: 'Health and nutrition', 'Education', 'Emotional well-being' and 'Living arrangements'. The child development measures in this study were designed to establish appropriate outcome measures that fall into these same four categories, and to relate them to the extent to which they achieve the desired outcome: a financially sustainable and secure environment that is both healthy and stimulating for raising children, and where orphans can live with people who care for them emotionally as well as physically. And further to examine the relative costs of alternative methods aimed at achieving the desired outcome.

Health and Nutrition: In this pilot study, the cluster home children were on average better nourished, as measured by standardised weight for age and weight for height, than the individual home children. Overall, better nutritional scores correlated with better scores on a number of the HOME sub-scales, building a picture of more organised households where both children's needs for stimulation and good nutrition are catered for, as contrasted with less organised care arrangements where neither is well supplied.

The better nutritional state of the children may be in part a result of higher expenditure on food for each child in the cluster home as opposed to the average estimated expenditure in the community. On the surface, this would seem to suggest that health and nutrition indicators may be improved in the community care models, simply by increasing availability of food. The analysis here, however, suggests that the link is not only with food expenditure, but also with aspects of household organisation. Thus, when considering ways to improve the outcomes of the cheaper model, simply supplying more food or income may only be part of the appropriate response. This raises the question of the efficiency of the different models to generate outcomes, given the same inputs.

In individual homes, better nourished children spent more time smiling or laughing, and performed better on cognitive tasks. We have no reason to believe that the orphans in individual homes in our study have fared any worse, with respect to health and nutrition, than other children in the same community. The main barrier to good nutrition is the extreme poverty experienced by most families in the area, particularly during winter when the needs for fuel and warmth would absorb some of the available income. Access to health care is limited by distance from the clinic and the expense of a taxi fare.

The evidence for poorer nutritional status among orphans, as compared with non-orphans from other countries, is mixed, with some studies showing no significant differences with respect to stunting (for example Lindeblade et al, 2000 in Kenya) and others showing increased stunting among orphans (for example Ainsworth and Semali, 2000). Overall, at very low levels of income, it would appear that whole communities are affected by the epidemic rather than individual households, because food production and the transfer of skills are affected (SADC, 2003). This could well be the case in our study area where a combination of poverty, winter drought and cold, and ill health or bereavement in many families may have reduced subsistence agriculture in the area and consequently the nutritional status of children.

If there are broader social factors associated with the children's outcomes, this raises another set of problems relating to the use of resources. The pilot study compared the outcomes of children in community-based care and those in a cluster home. If, however, all the children in the community are, on average, doing badly as a result of the social environment in which they live, is it appropriate to consider special measures only for the orphaned children? While this is not an issue that can be dealt with here, it does highlight the importance of considering the costing results in light of the social circumstances, knowledge of which may be gained through more qualitative research, such as the narratives and observations conducted in this pilot.

Education: Similarly, the poor standards of education among children in our study may not be so much an effect of individual orphanhood as of the generally poor standard of schools in the area, and the impact of the epidemic on the education system. In South Africa, and even in this rural community, the quality of educational provision varies widely. The children in the cluster home were sent to a better school; the children from individual homes were not as prepared cognitively and educationally for the modern world, despite being on average older and less traumatised than the children in the cluster home. On the arithmetic test in our battery of measures, the orphans in our study area did slightly better than a comparison group in a different part of the province. A Zimbabwean study has shown that the impact of orphanhood on the level of education attained increased as time passed since the mother's death (Nyampuka et al., 2003). The high level of developmental risk encountered by the orphans in our study (see summary table) would support the view that the risk of slow progress in school or dropping out altogether might increase over time.

The cluster homes children's access to better schooling and after school support is a major contributor to the higher costs. The cost analysis suggests that, as a result of this increased investment, the children are performing better. Considering only the cost of education, the individual homes are cheaper and may be favoured. Considering both costs and outcomes, policy makers would have to decide if they felt the improvement in educational outcomes was worth the additional investment of sending children to a better school. Considering, costs, outcomes and social environment raises the concern that all children in the community are suffering as a result of the quality of education they are been offered. Is it appropriate to consider the educational needs of orphans in isolation? Again, as was the case with health, it was not only the investment on education that was associated with better outcomes, suggesting the possibility of other types of intervention.

Stimulation in the home and particularly responsivity to children, as measured by the HOME inventory, was strongly associated with good outcome measures on the educational and cognitive tests. This is to be expected from the considerable psychological literature on the importance of facilitative interactions for children's cognitive development and based on Piagetian and Vygotskeian theories. Giese and Dawes (1999) show that, in an orphanage in the Western Cape, most of the interactions between staff and children were designed to regulate the children's behaviour rather than to respond with information to their utterances or to elicit cognitively demanding responses from them.

In the present study, adult-child conversations were limited in accordance with cultural practice, but this did not preclude considerable variation in the amount of responsivity observed between caregivers and children.

Emotional well-being: The USAID overview (2004) reports that 'studies consistently detect depressive, internalising problems among orphans'. Our present sample was too small to give a definitive comment on the emotional well-being of the orphans. Emotional well-being was assessed from the narrative accounts of caregivers and from the naturalistic observations of the children's activities: an approach that gave insight into the caregiver' handling of the children's expression of emotion, rather than quantifiable levels of emotional function. The results showed, not surprisingly, that the children's expression of positive emotions, as measured in the behaviour observations, varied with the emotional climate in the home, suggesting that interventions that supported the whole family would be worth considering. The caregiver accounts also made it clear that some of the children in the cluster home had demonstrated a level of behavioural disturbance that would be difficult to handle in a family home.

Living arrangements: Children living in orphanages may be adversely affected by the lack of opportunities for long term relationships with caregivers (Richter et al, 2004). The cluster home arrangement in our study differed from standard institutions in many respects, but probably the most salient of these differences was the way in which long term relationships with caregivers were planned and supported so that the children living in the

cluster home were able to overcome many of the symptoms of emotional crisis from their former lives. Such knowledge of the links between structure and outcomes is important in interpreting the costing results. This information suggests that if using the costing to plan a similar or expanded intervention it would not be appropriate to change this aspect of the models design. Similar outcomes could not be expected if live-in caregivers were replaced by, say, shift workers or if children were not linked directly to one caregiver.

Living arrangements were mainly assessed through the adapted HOME inventory. There was considerable evidence of internal consistency between the scores from the HOME inventory and other child development measures. Some of this could be the result of the non-independence of the measures, although in the case of the nutritional indicators this was unlikely. The items were adapted for cultural practice, so the intention behind the item was preserved even if the events or objects had been changed. Thus an item that noted the child's inclusion in excursions to museums and concerts was supplemented with attendance at traditional ceremonies. Encouraging children to attend such events could be construed as encouragement to learn about the history and practices of the community. Some of the sub-scales did not fulfil the requirements for the present study (Integration of Family and the Physical Environment) because the issues addressed by the items related very strongly to a developed country context. For example, overcrowding in terms relevant to the health of inner-city children in the United States, were not relevant to children living in small dwellings in sparsely populated countryside.

Evidence for neglect and lack of supervision was not covered by the HOME inventory, and this was an important issue for the orphan study. In several cases, when visiting the individual homes, the observers found that the child had arrived home from school and there was no adult present, nor did the child know where the adults in the family had gone. Lack of supervision of very young children is a particularly worrying feature of the individual care arrangements and is more likely to happen where the caregiver is burdened with too many responsibilities or has few resources. One of the key strategies for the care of orphans detailed in the UNAIDS and UNICEF 'Framework' document (2004) is to strengthen the capacity of families to protect and care for orphans. They note that families are the best hope for vulnerable children, and one of the aims of the present study is to investigate the role of financial aid to the families. But our results point to the fact that direct financial aid is only a part of what is needed. Psychosocial problems may need a variety of intervention measures to address them: bereavement counselling, with group approaches, peer support, and individual counselling. Schools and faith-based organisations might provide the structures necessary for this kind of support. This result again points to the need not only to consider the costs and outcomes, but also the causes of the differential outcomes, so that ways in which models can be improved can be identified.

Overall, for indicators of health, mental health and educational attainment, the differences between orphans and non-orphans are likely to be marginal at this young age in this rural community, because the poor services offered impose limitations for all children in the

community. The outcome measures utilised in this study have been sensitive to a number of shortcomings in the resources available to orphans in this small sample, but a more structured approach would be needed for large sample sizes.

The varied nature and the seriousness of deleterious factors exposed in the course of data gathering indicated a high level of developmental risk in this group of orphans, which could have a cumulative effect over time. A developmental approach is concerned with changes over time; early studies in risk and resilience have made it clear that some stressors are more damaging than others at different developmental stages (Werner and Smith, 1982). If we are to achieve a greater understanding of the developmental risk associated with different replacement care options at different stages in the child's development, we should develop a simple, robust set of outcome measures that are capable of being repeated in different places and at different times.

When the results of the analyses of outcomes and costs are combined, a more comprehensive picture of the situation can be presented. Collectively, the results show that the cluster home, while more costly, does achieve better outcomes in a number of regards. They also show that there is scope for improvement within the community models, linked particularly to the children's nutritional status and the income of the household. The analysis presented and discussed here further highlights the need to consider the broader social environment in which the children live.

While this pilot study is too small to make major conclusions, it does highlight the importance of considering both costs and outcomes. Considering the cost results alone may be interpreted to suggest that care within the individual households is far more efficient. The examination of outcomes, however, suggests that there are a number of problems with the standard of care available in individual homes. Even if this were a generalisable sample, it would not mean that such a result suggested that cluster homes should be set up in place of care within individual homes. It would be worth first considering if steps could be taken to strengthen the care in individual households so that children would do better, and to compare the cost of these steps to the cost of providing cluster homes. In all likelihood such an analysis would show that it would be more efficient to support individual homes than to move children to a cluster home. This in turn would not mean that the more expensive cluster home does not have a place, as there will always be a need to care for children who, for whatever reason, could not be placed in individual homes.

Neither model examined here is a clear 'winner' and it is unlikely that, if such methods are used more widely, there would be many clear winners. But the combination of the two sets of results does allow for the possibility of more informed decision making. The end decision is, however, almost always going to be subjective. The only time that there may be a clear choice is when one model is more expensive and performs worse on the outcome

measures, this may be the case with institutional care when compared to some sort of supported community model.

It needs also to be remembered that orphan children are only one category of vulnerable children. This pilot study focused on a specific group, but many children in the community are at risk, even if their parents are alive. When evaluating interventions for one group, the general needs of others must to be kept in mind. Again, while too small to make general conclusions, this pilot did find that many of the causes of poor outcomes for children related not to their orphaning, but to their poverty.

METHODOLOGICAL LESSONS AND ISSUES

The purpose of this work was to develop methods to evaluate alternative models of care from both a cost and quality perspective. In designing the method and applying it in a pilot study, a number of lessons were learnt and it was possible to examine the potential usefulness of the approach. The following section discusses some of these lessons and issues in the hope that it can contribute to further work in this area.

The range of assessments resulted in a set of outcome measures that accords well with childcare in East and Central Africa (Save the Children, 2004). This set of indicators includes nutrition, access to health care, encouragement of recreational activities, children's rights to privacy, support, approval and respect, setting of limits and encouragement of maturity and positive attachments.

The assessments also accord well with current multi-method approaches and attention to cultural formulations for the assessment of children's socio-emotional development (Carter et al, 2004). The measures were generally sensitive to the issues that we wanted to explore and complemented each other. The interviewers had many interactions with the family: he or she took a general history from the caregiver and administered the income and expenditure questionnaire, the child was tested on the cognitive tests, weighed and measured, and observed in free play on at least two separate days. Finally, the HOME inventory was filled out with a combination of direct questions about family events and observations. By this time there had been quite a comprehensive opportunity to assess the caregiving environment. Through repeated visits, the interviewers developed sufficient rapport with the families for caregivers to express some of the anxieties that were kept hidden during the initial visit. Activities that enabled children to talk about their feelings

and experiences would have been a useful addition to the assessment measures, but were unfortunately not possible to implement within the time frames of this study.

Superficial impressions from individual data sources that most children and caregivers were coping well were misleading. It was only when various sources of information were combined that the extent and seriousness of the problems facing the caregivers and the children were apparent. The variety of methods utilised, and the time spent in the home assessing, interacting with, and observing family practices uncovered problems that would not have been manifest in a more cursory investigation. This led to a deeper level of understanding of the needs of the orphans. To achieve the same level of insight in a shorter procedure for use with a larger sample will require careful piloting of instruments to ensure that a wide range of problems is noted. From the qualitative and quantitative accounts given here, it should be possible to select appropriate and less labour-intensive screening measures.

The deleterious factors identified were diverse – implying that poverty and poor health were so pervasive that any stressor tipped the balance between coping and not coping. The implication for further research is that a larger sample size and studies in different geographical areas are needed to ensure that the results are not location-specific.

The use of the adapted HOME inventory, together with substantial interaction with the caregiver and observations of the children's activities, gave reliability to the interviewer's rating on the various sub-scales beyond what could have been achieved by using this instrument alone in a single visit. This had obvious advantages for analysing the relationship between the economic support available to the orphans and the child development indicators. Error variance was reduced and statistically significant associations between financial support and child outcomes were recorded in a number of instances. There were, however, disadvantages to this process, stemming from the non-independence of measures. This was particularly the case in the regression analyses where there was intercorrelation with other scores and measures and the resulting collinearity limited the inferences that could be made.

A number of difficulties arose in the design of the costing methodology. While problematic, the method nevertheless allowed the generation of results that usefully complemented the assessment of outcomes. The differences in costs between the models in the pilot study were great and any minor problems with estimation would not have changed conclusions. This essentially is the purpose of the costing. It is not intended as an exact estimate, but rather provides an idea of what the value of resources used is. As the outcome measures are not all easily quantified, even if models were very similar in costs this method would be acceptable. The conclusion would be that models were similar in cost and outcomes, and this would be the basis for decision making. The method of costing developed here is also useful in that it allows meaningful comparisons across models that only have the goal of childcare and those that have many goals. For example,

comparisons of institutions and community-based models could be considered meaningfully with this method.

Although it has not been a focus of the discussion, the costing also allows for the investigation of the distribution of costs. The cluster home model, for example, was paid for by government grants, and donated monies and goods. The individual homes covered costs through donations and grants and their own resources. Care within the community, of course, costs the community more than care provided by an external organisation.

While lessons were learnt for conducting outcome evaluations and for conducting costings, one of the major aims of this exercise was to learn lessons regarding their combination. The use of a narrative approach assisted in a number of ways, one of the important lessons was its key role in shaping the later analysis. It was originally the intention of this pilot study to investigate the differences between two types of community care and the cluster home. The narrative, however, highlighted that the one sub-group of individual homes had such a collection of problems, not necessarily associated with their similar model of care, that their analysis as a group would have been misleading.

In order to begin to understand returns to investment within the different models, it was important to capture the cost data in such a way that the analysis could link outcome measures with specific costs. For example, it proved insightful to examine food expenditures' association with nutritional status.

More work, however, is needed to better understand how the returns to investments in specific outcomes vary according to models: that is, how outcomes differ for say education, given differing levels of investment within the same model. This, however, would require a far larger sample to investigate but is worth considering when larger evaluations are designed.

The methods and analysis presented here were designed with the aim of linking costs and outcomes. It was, however, decided to include some examination of the causes of differential outcomes and this proved invaluable in the analysis. If only outcome measures and costs were captured, inappropriate conclusions might be drawn from the results. It may be easy to conclude that, if one model fairs poorly in regard to a particular outcome measure and they have a low level of expenditure in this area, this low level of expenditure is the cause. Such a conclusion would lead to an obvious set of policy decisions. If, however, the analysis shows that it is not only the low level of expenditure that has lead to the poor showing, but some other aspect of the care, the policy response may well be different.

This pilot study utilised a wide variety of tools to understand the cost of the models, the composition of this cost, the outcomes, and the background and causes of these outcomes. If a similar study were to be undertaken on a larger scale, it would be unlikely that all of these methods could be repeated. From the experience gained in this pilot, however, it

would seem advisable to use a variety of approaches, if not on the entire sample then on a sub-sample. What may be appropriate is to conduct the measuring of outcomes on a large sample, the costing on a slightly smaller one and the in-depth narrative and pathways to outcomes analysis on even smaller samples.

CONCLUSIONS

A great deal of information is required if the limited resources available to respond to the many children in need of replacement care are to be used efficiently. This paper has attempted to develop a method that aims to provide some of that information. It has shown that the combination of costs and outcomes, while difficult, can be useful. The pilot study showed the potential strength of such an approach.

Further work is, however, needed. This method needs to be further refined and applied on a larger scale. Efforts have to be made to find ways to determine what are appropriate minimum standards of care, so that models that do not, and will never be able to, pass such standards are not considered as options. A very important area of work, on which some efforts have already been made, is to consider the costs and returns of efforts to improve programmes: for example, the costs of efforts to support the psychosocial needs of orphaned children in communities, comparing the returns on different investments. Such approaches, when combined with evaluations of costs and outcomes of different models and a consideration of minimum standards, will allow for informed decision making.

Additional work is also needed to investigate alternative ways of meaningfully presenting the information required to make decisions. Decisions in the end will reflect values placed on the development of children; while this is necessary, it should be done openly and with adequate supporting information. The presentation of results is likely to play an important role in shaping decisions and should, therefore, be considered carefully.

This paper has attempted to develop a method that will more meaningfully provide some of the information required to inform decisions relating to the expansion of replacement care in the face of increasing need. This information is, however, only one part of a chain of information required. What is required is to develop further the methods presented here and repeat them on a larger scale and to combine them with approaches that examine returns to investments aimed at improving care. This should to be done with some urgency as the need to plan and develop our response to the impact of AIDS on children has long since arrived. If we are to build an informed and efficient response, research to provide supporting information to policy makers and implementers, must to be more appropriate and widely available.

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Appendix A: Narrative guidelines

1. How the caregiver came to be looking after the child

- When did the child's parents die? Did the child come to the caregiver before the parents' death, straight after or a long time after?

- Is the child related to the carer? How?

- Are there siblings and are they also here? If not, where are they?

- Did she offer to look after them or did someone ask her?

2. How is the caregiver coping?

- What difference has it made to her life to look after the child?

- Have other people helped her?

- Is the child easy to look after? Helpful in the home? Does he/she get on well with other family members?

3. How is the child coping?

- Was the child noticeably upset by the parents' death? What did you notice? What did you do about it?

- Who in the household does the child spend most time with?

- Would you say that this child is a happy, laughing child? If not, how would you describe him/her? Does he/she cry a lot?

- Does this child talk much? What does she like to talk about?

- Does she ever talk about her parents? If yes, what does she say?

- Does she like company? Does she have friends? Who are her close friends? Are they older or younger? Boys or girls?

- Does she like to sing? Dance? Play? If play, what does she play at?

- Is the child well behaved? Do you have any problems with her? Is there anything she does that worries you? Have you noticed anything odd about the things she does?

- Is she getting on well at school? What is she really good at? What does she have difficulty with?

- Does she ever lose her temper? If yes, can you recall when she did this? How did you respond? What upset her? Is she ever naughty? Do you have to punish her for naughtiness? If yes, what do you do?

Appendix B: Levels for direct observation

Motor activity (4 levels)

1. Energetic: Using more energy than necessary to move from one place to another. Examples: running, skipping, hopping.
2. Mobile: Walk, stand up, sit down.
3. Stationary: Child stands or sits in one place, but is engaged in an activity. Examples: Talking to friends, bouncing a ball.
4. Immobile: Child remains in one place and is not engaged in any observable activity other than minor movements (such as scratching, or swaying slightly)

Emotional State (5 levels)

1. Overt negative: e.g. crying
2. Mild negative: e.g. frowning.
3. Neutral: No observable emotion
4. Mild positive: e.g. smiling
5. Overt positive: e.g. laughing out loud.

Social Interaction (4 levels)

1. Cooperative: e.g. turn-taking, role-playing
2. Associative: e.g. hugging, conversing
3. Onlooker: e.g. watching a game
4. Solitary: No evidence of interest in others or participation in social activities.

Vocalisation (to or from the focal child),