

Micro-Costing in Public Health Economics: Steps Towards a Standardized Framework, Using the Incredible Years Toddler Parenting Program as a Worked Example

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Abstract Complex interventions, such as parenting programs, are rarely evaluated from a public sector, multi-agency perspective. An exception is the Incredible Years (IY) Basic Parenting Program; which has a growing clinical and cost-effectiveness evidence base for preventing or reducing children's conduct problems. The aim of this paper was to provide a micro-costing framework for use by future researchers, by micro-costing the 12-session IY Toddler Parenting Program from a public sector, multi-agency perspective. This micro-costing was undertaken as part of a community-based randomized controlled trial of the program in disadvantaged Flying Start areas in Wales, U.K. Program delivery costs were collected by group leader cost diaries. Training and supervision costs were recorded. Sensitivity analysis assessed the effects of a London cost weighting and group size. Costs were reported in 2008/2009 pounds sterling. Direct program initial set-up costs were £3305.73; recurrent delivery costs for the program based on

eight parents attending a group were £752.63 per child, falling to £633.61 based on 10 parents. Under research contexts (with weekly supervision) delivery costs were £1509.28 per child based on eight parents, falling to £1238.94 per child based on 10 parents. When applying a London weighting, overall program costs increased in all contexts. Costs at a micro-level must be accurately calculated to conduct meaningful cost-effectiveness/cost-benefit analysis. A standardized framework for assessing costs is needed; this paper outlines a suggested framework. In prevention science it is important for decision makers to be aware of intervention costs in order to allocate scarce resources effectively.

Keywords Prevention science · Economics · Parenting program · Disadvantage · Prevention · Flying Start · Children

Introduction

Parenting Programs

A report by the National Institute for Health and Clinical Excellence (NICE) stated evidence based parenting programs such as Incredible Years (IY) are effective for both the treatment and prevention of behavioral problems including conduct disorder (CD), and associated social and emotional problems (National Institute for Health and Clinical Excellence [NICE] 2006). Parenting programs such as IY have been shown to be significantly effective at reducing problematic child behaviour in school-aged children, and as preventative interventions in populations where children are deemed “at risk” of developing CD, due to socioeconomic risk factors such as living in disadvantaged areas (Dretzke et al. 2005; Furlong et al. 2012). The IY series of parenting

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programs was developed by Webster-Stratton starting with the Basic program in 1978, for families with children aged between 0–12 years (Webster-Stratton and Reid 2010). Effective components include group discussion, role-play, and video-modelling to enhance skills to manage problematic behaviour and teach prosocial alternatives (NICE 2006). Programs are delivered by two group leaders in 2–2.5 h weekly group sessions, lasting between 8–18 weeks (depending on the program) (Webster-Stratton and Reid 2010). A recent systematic review of group-based parenting interventions for children age 3–12 years with early onset conduct problems identified 13 trials; 9 of the 13 trials evaluated the IY program (Furlong et al. 2012). The IY Toddler program teaches praise and encouragement to build children's self-esteem, develops strategies to cope with toilet training, sharing, plus bed times, and encourages social and emotion competences. The program is broken down into four parts delivered over 12 weeks.

In the U.K. parenting programs are typically delivered through health and social care services, provided through a predominately tax funded system. The Government usually sets the budget, and local commissioners allocate funds to local services. There is need for accurate and detailed cost data to provide decision makers with the appropriate information to decide whether a program is worth the financial investment.

An Introduction to Micro-Costing

Research has typically focused upon the scientific rigor of interventions, evaluations, and trials rather than the dissemination of results when interventions go to scale (Steckler and McLeroy 2008). Prevention science has placed greater emphasis upon assessment of outcomes rather than of cost. Health economists are currently making efforts to standardize data collection methods for economic evaluations (Ridyard and Hughes 2010); however, this standardization is not currently wide-spread in newer subdisciplines of public health economics, which focus on upstream prevention. Micro-costing is a method which provides crucial, detailed cost data. Accurate costs of an intervention at the micro-level are required in order to perform accurate further economic analysis such as cost-effectiveness or cost-benefit analysis, thus giving a complete analysis of outcomes alongside the cost at which they are achievable. Cost-effectiveness analysis (commonly used in the U.K.) expresses results as a ratio of a cost per unit of health outcome, normally expressed in “natural units” (Morris et al. 2007), while cost-benefit analysis constructs an inventory of all costs and benefits valued in monetary terms for the intervention in question (Morris et al. 2007).

To conduct a micro-costing analysis one must first identify the perspective of the micro-costing; for example,

healthcare, social care, or multi-agency public sector. Perspective determines the range of cost elements to be included and excluded in the micro-costing. A multi-agency perspective would include all costs related to all services accessed by individuals (e.g., healthcare, social care, and education services for children). Second, the individual resources required for the delivery of the service must be identified and each assigned a quantity and value (Drummond et al. 2005; Morris et al. 2007) (e.g., rental costs of a hall to conduct a parenting group at £20 per week). Third, the individual resources must be categorized, for example, into recurrent and non-recurrent costs. If a service relies heavily upon staff time, staff costs may be quantified by the total time (plus relevant overheads) necessary to deliver to the service, and then valued as the total wages for that time (Drummond et al. 2005; Morris et al. 2007; NICE 2006). Each intervention/service will require different resources. Resources are likely to be identified and categorized in diverse ways by different researchers, with differing analytic perspectives. It is therefore vital that the decision process and methods are clearly described when reporting micro-costing exercises.

Kinsella (2004) outlines lessons learned from past micro-costing exercises. First, precision is vital; researchers should obtain as much data as possible on each aspect of the area under study. For example, to value staff travel time, a mileage estimate is required plus their time foregone (referred to as opportunity cost, the costs of committing resources to produce a service in terms of the next best alternative foregone), which would require information about their wages. When estimates have to be made, they must be noted and justified, as any error in estimates will impact upon the reliability of results. When selecting variables for costing there is a need for discretion. It is extremely difficult to account for every cost associated with a service. Second, define the scope of the micro-costing before performing the analysis; for example which costs will be included and excluded. Researchers may trade increased precision depending upon the availability of data and time allowed for the study. Third, cooperation with staff members who are providing costs is essential to obtain accurate data, while keeping legal/ethical guidelines such as data protection in mind. Without the collaboration of professionals such as medical and administrative staff to gather accurate data, micro-costing will not be successful. Fourth, it is advisable to use a time-stamped electronic data gathering device, such as a laptop computer to collect data prospectively. Micro-costing allows for extrapolations, which may ultimately focus health care provision because the precision gained from this method allows a more targeted and detailed evaluation (Kinsella 2004).

The Importance of Micro-Costing in Early Intervention Programs

There is evidence of the high costs to individuals and society of antisocial behaviour, crime, and unemployment without early interventions (Allen 2011). There is growing interest from U.K. Government policy makers in early intervention programs that have the potential to positively influence child outcomes. The availability of cost data for decision makers is critical. Program costs, such as set-up and delivery costs, need to be accurately calculated at the micro-level to enable further, accurate economic analysis including the cost-effectiveness or cost-benefit of a program. A lack of detail or underestimation of costs at the micro-level may result in a flawed cost-effective analysis with considerable implications. For example, a program may be perceived as cost-effective and rolled out, only to be abandoned when delivery costs are found to be more expensive or more resource intensive than first thought.

Previous Micro-Costing Analyses of Parenting Programs

A recent review of the economic evidence of parenting interventions for CD (Charles et al. 2011) found that previous economic evidence in relation to parenting programs reported intervention costs, but rarely reported details of the strategy employed to calculate program costs. In these times of austerity, such as the present time in the U.K., micro-costing is vital to inform decision makers of the detailed costs associated with implementing parenting program in order to commission programs that are both effective and cost-effective. A critique of previous micro-costing exercises involving the IY Parenting Programs follows.

Olchowski et al. (2007) gathered and presented costs of IY programs, but did not use the micro-costing data to conduct a full cost-effective analysis. The costs included leader training, handbooks, materials such as puppets, worksheets, staff session preparation time, session delivery time, catering, cab vouchers, day care facilities, or compensation for off-site childcare. Reported total program costs did not include rental of space in which to conduct the program, and administrative costs. Olchowski et al. (2007) state that rental of space costs were not included as agencies were usually able to provide ‘free’ space in which to deliver the program, but suggested including rental of space costs in per child cost estimates. No estimation of space costs, however, was provided. Administrative costs were also omitted from total program cost calculations. A lack of detail and strategy when conducting micro-costing exercises can lead to the omission of important costs that could affect further cost-analysis. For example, if rental of space and administrative costs were included in Olchowski et al.’s (2007) analysis, then program costs would have increased resulting in a

higher ratio of cost per unit of outcome, and reduced cost-effectiveness.

Edwards et al. (2007) conducted a micro-costing of the 12-week IY Basic Parenting Program, adopting a multi-agency public sector perspective, alongside a pragmatic randomized controlled trial (RCT) of the clinical effectiveness of the program (Hutchings et al. 2007). Costs were divided into non-recurrent initial training and group set-up costs such as purchase of program materials, the recruitment of parents through home visits, letters, telephone calls, and recurrent group running costs such as room rental, and crèche (child care/day care) facilities. Edwards et al. (2007) followed Kinsella’s (2004) lead with a more precise and detailed micro-costing than that presented by Olchowski et al. (2007). Edwards et al. (2007) divided program costs into two distinct categories (non-recurrent costs and recurrent costs), and labelled each cost element. They also consulted with group leaders and the IY Wales Centre in the decision making process of which cost elements to be included in their micro-costing, and develop cost diaries in order to gather accurate costs. A weakness of this study was that sensitivity analyses only assessed varying numbers of participants per group; that is, no analyses were conducted to assess the effect of delivering the program under different contexts, or in different geographical locations.

More recently, O’Neill et al. (2011) conducted a micro-costing of the 12–14 week IY Parenting Program in Ireland, alongside a pragmatic RCT of the clinical effectiveness of the program (McGilloway et al. 2012). O’Neill et al. (2011) included a range of program costs; for example, staff time and mileage to conduct home visits, telephone calls to recruit parents, session preparation time, group running time, supervision time, crèche (child care/day care) facilities, taxis, food, and administrative costs; however, initial training and group set up costs were not included in the micro-costing. Costs were divided into three broad categories: direct wages, mileage, and other expenses, but no specific detail was given about how each element of cost was identified, or valued within the specified categories. O’Neill et al. (2011) also enlisted the help of group leaders and the IY Wales Centre to develop cost diaries to gather all cost information, thus enhancing the quality and accuracy of cost information. However, the broad categories used in their micro-costing (e.g., other expenses) provide little detail for the reader of the specific cost elements associated with that particular category. Program costs presented in the original three published papers described above were converted into Pounds Sterling and inflated to 2008/2009 costs (Curtis 2009; International Monetary Fund 2009) (available online).

These three examples highlight the different approaches and levels of detail given in micro-costing; for example, inclusion, exclusion of cost elements, and categorization of

costs (e.g., broad versus specific). It is clear that micro-costing strategies with regard to accuracy, detail, and inclusivity potentially affect cost-effectiveness estimates. A standard approach is needed.

There are very few references to micro-costing methods relevant to prevention science. This paper contributes to the field by presenting a newly developed framework, based on previous work by Edwards et al. (2007), Griffith et al. (2004), and Kinsella (2004), providing step-by-step descriptions of micro-costing processes. These steps provide practical guidance for service managers, decision makers, health services, prevention scientists, and health economics researchers when conducting micro-costing exercises of parenting programs. The preventative IY Toddler Parenting Program, to improve social and emotional well-being, is used as a worked example.

Methods

Our micro-costing was conducted from a public sector, multi-agency perspective as a component of a pragmatic RCT evaluating the IY Toddler Parenting Program in Wales, U.K. (Griffith et al., Universal interventions in targeted communities to tackle the negative impacts of child poverty: What have we learned?, unpublished). The main trial was funded by the Welsh Assembly Government (WAG) 2008–2010, and the micro-costing element by the Welsh Health Economics Support Service 2009–2012. The sample consisted of 89 parents of toddlers aged 1–3 years living in disadvantaged Flying Start areas in Wales, U.K. Flying Start is a WAG initiative in which families living in areas of socioeconomic disadvantage are eligible to receive additional health visiting services, free childcare, parenting, and basic skills support (WAG 2005).

IY Toddler Parenting Program Group Format

A maximum of 10 parents attended weekly 2–2.5 h parent program sessions for 12 weeks. Both parents were invited to the group, but generally only the primary caregiver attended. The primary caregiver completed the RCT assessments. Two trained leaders introduced a structured sequence of topics using videoexamples and role-play.

Group Leaders

The group leaders were health visitors and child care practitioners, trained in the IY Toddler Parenting Program, and supervised weekly by the fourth author, an accredited IY trainer. Health visitors are qualified nurses or midwives who provide advice and health care in the community as part of a primary healthcare team (often through home visitation) to parents of preschool children. Child care

practitioners are qualified in early years care and education, and provide high quality childcare.

Micro-Costing

Parenting programs are complex interventions (Medical Research Council [MRC] 2008) and therefore costs and benefits of participating in such a program can be accrued by multiple agencies; hence, a public sector, multi-agency perspective was chosen. The costs of the IY Toddler Parenting Program were calculated in three “real world” contexts; 1) the initial set up of the IY Toddler Parenting Program as part of normal service delivery with newly trained leaders; 2) the subsequent delivery of the IY Toddler Parenting Program as part of normal service delivery (with initial training and supervision already undertaken and materials purchased), and 3) the set up and delivery within a research/development context with newly trained (uncertified) leaders.

The developed micro-costing framework outlined below was based on standard methods of cost gathering and previous examples of micro-costing (Drummond et al. 2005; Edwards et al. 2007; Griffith et al. 2004; Kinsella 2004; Morris et al. 2007). Each element of cost (e.g., training costs, group material pack costs, and venue rental costs) was labelled individually and given its own unit cost. These costs were then summed to give subtotals for each category of cost (e.g., set-up costs and group costs), and the subtotals were then summed to calculate a total cost for the whole program. Costs were also divided into the following two components based on the “real world” process necessary to set up and deliver the program: 1) set-up costs (e.g., initial training costs, supervision, and set-up before the start of the program), and 2) group costs and delivery costs (e.g., engagement/recruitment of parents, room rental for program delivery, administrative costs, and crèche facilities). The crèche facility provides child/day care for children, whilst their parents attend the group session. Supervision provides an opportunity for an experienced, accredited IY leader to rate the quality of the group leaders’ delivery of the program, and offer feedback while viewing videotapes of sessions, with the leaders present. Supervision whilst delivering the program is encouraged to promote implementation fidelity. In non-research contexts the supervision lasted a day (7.5 h); however, under research/development conditions, an additional 3 hours of supervision took place weekly throughout program delivery. Weekly supervision is suggested in order to maintain fidelity when delivering the IY parenting programs as part of a research trial, with trained, but uncertified, leaders (Webster-Stratton 2004). Supervision assures a supportive infrastructure and quality control of the program delivery; in order to make sure that the research is a true test of the program as

established in its initial efficacy trial (Webster-Stratton 2004).

Sources of Unit Costs

The mean unit delivery costs of running the group such as parent recruitment letters, home visits, telephone calls, room preparation, session delivery time, catch up home visits, rental of halls, taxis, food, and crèche (child/day care) facilities were extracted from cost diaries, completed weekly by both consenting leaders of five of the nine groups ($n=10$) in the intervention arm of the trial.

Micro-Costing Framework for the IY Toddler Parenting Program Example

Step 1 Development of cost diaries

A cost diary developed with group leader focus groups and the IY Wales Centre by Edwards et al. (2007) was used in the current RCT to establish the costs to set up and deliver the IY Toddler Parenting Program. Activities such as the purchase of raffle prizes, felt-tip pens, paper, and photocopying were listed as examples under the heading of ‘administrative costs’ in the diary to guide and inform leaders. The categories were listed in a Microsoft Excel table, with a column for each week of program delivery (available online).

Step 2 Cost data gathering from group leaders taking part in the RCT

Group leaders were first contacted by the first author by phone to explain the study, and to ask if they would consent to completing a cost diary. We endeavored to obtain diaries from every group leader participating in the RCT, in order to provide us with as much cost information as possible. Ten of the 18 group leaders consented to complete the diaries. Costs were gathered from two of the three groups in South Wales, two of the five groups in North Wales, and the single group run in Mid Wales. Eight leaders were unable to complete cost diaries due to time restrictions.

The consenting group leaders received the diary via email as a Microsoft excel file. Group leaders were requested to give as much detail as possible about length of time spent on different tasks; for example, travel to group sessions, room preparation, and running the group sessions. The leaders completed their electronic diaries weekly, and returned their completed cost diary by e-mail at the end of

the 12 weeks to the first author. Leaders received a £20 book token in recognition of their time in completing the diary. During engagement and recruitment of parents, eight of the ten group leaders stated the same amount of time to complete these tasks; therefore, the mode values were used in the tables. In the case of group running costs such as time to prepare the room for the session, time to conduct catch-up home visits, costs of crèche facilities, rental of halls, and additional administrative costs, the group leaders provided a range of time taken and costs. Therefore, a mean was calculated to provide the average cost for these tasks across the groups and was presented in the tables. It should be noted the ranges and standard deviations for these costs were small, and the final costs reported in the table were endorsed by the leaders who completed the diaries.

Step 3 Cost data gathering from additional sources as required

Gathering cost data from additional sources was necessary to ascertain costs not retrieved through the diaries (e.g., salaries of group leaders, group material costs, and training costs). We used national costs where available, and referred to service managers and the IY Wales Centre when these costs were unavailable. The hourly wage for health visitors was extracted from the U.K. Health and Social Care Unit Costs (Curtis 2008) to provide a U.K. average hourly wage for health visitors, which was checked and approved by the group leaders and service managers. The hourly wage for child-care practitioners was calculated as an average from information provided by a range of participating service managers whose services deliver the IY program. An additional 25 % was added to the child-care practitioner wage for national insurance and superannuation. The hourly wage presented in the tables shows the mean wage for group leaders, which formed the basis for calculation of costs for all staff-related tasks in delivering the program. The purchase costs of the program materials, initial training, and trainers’ wages to deliver supervision were supplied by the IY Wales Centre.

Step 4 Construction of tables

Tables 1, 2 and 3 present the overall cost of the program in three “real world” contexts, which can be used as a guide/template to calculate a cost per person of other programs and under different contexts, to enable comparisons between other programs and settings.

Table 1 Total costs to set up the Incredible Years Toddler Parenting Program with one health visitor and one child care practitioner running the group

Type of cost	Units	Unit cost (£)	Total cost (£)
Set-Up Costs:			
Initial training costs:			
Materials (program materials)	1 pack of IY toddler program materials	£1027.89 for one pack of IY toddler materials (including Value Added Tax)	£1027.89
Training course fee	3 day training	£470.00 (including Value Added Tax) per leader	£940.00 (including Value Added Tax) for 2 leaders to attend training
Leader wages for two group leaders to attend training	3 day training (7 h each day)	£493.92 per leader	£987.84 for 2 leaders to attend training
One day supervision before start of program			
Supervision of group leaders before start of program including travel	1 day (7.5 h)	£350.00 (flat rate) for trainer wages to deliver supervision	£350.00
Total:			£3305.73

Results of the Micro-Costing Analysis

Step 5 Conduct micro-costing analysis: an IY Parenting Programs example

Micro-costing creates a clear picture of costs if conducted accurately and sensitively. For the year 2008/2009; the total costs to set up and deliver the program as part of normal service delivery were £9326.73 (total costs from Table 1 £3305.73 plus total costs from Table 2 £6021.00). Thus, the total cost to set up and deliver the program to a group of eight parents was £1165.84 per child. The cost of the program, excluding initial training, and initial set-up costs (e.g., materials), based on eight parents per group, was £752.63 per child. Within a research/development context, with the associated high levels of supervision the total costs for a group of eight parents including initial training, recruitment, and group running costs were £1509.28 per child. The costs of the program without initial training and initial set-up costs (e.g., materials) were £1096.07 per child.

The tables present data from the weekly-completed cost diaries. Table 1 presents the reported set up costs, illustrating the total costs of materials, training, and one-day supervision, per program. Table 2 presents the reported delivery costs of the IY Toddler Parenting Program with initial training and supervision already undertaken, and materials purchased. Table 3 presents the reported set up and delivery costs of the program. This table differs from the previous two tables; the IY developer's fidelity

guidelines recommend that weekly supervision should be undertaken when the program are delivered within a trial setting by trained, but as yet uncertified, leaders (Webster-Stratton 2004).

Step 6 Conduct sensitivity analysis

Sensitivity analysis allows one to explore the extent to which the assumptions made are held, whilst adjusting key variables. Sensitivity analysis was applied to establish costs for ten/group instead of eight by calculating additional recruitment letters, telephone calls, home visits, and catch up visits and calls. The costs per child reduced from £752.63 to £ 633.61 under normal service delivery (excluding initial set-up costs), and within a research trial from £1509.28 to £1238.94 (excluding initial set-up costs).

This paper is based on a trial undertaken in predominantly rural Wales, U.K. To estimate parenting program delivery costs in a high-cost, urban area such as London, U.K. A London weighting calculation was applied for staff salaries only (e.g., group leader salaries to deliver the program, trainer salaries to deliver supervision, and crèche staff salaries) following the use of the London Multiplier as detailed by Curtis (2009). When this London weighting was applied to the costs of set up and delivery of the program as part of normal service delivery, the total program costs increased from £9326.73 to £10560.27, making program delivery £1233.54 more expensive. If the program was delivered as part of a research trial in London, costs would increase from £12074.25 to £13769.63, making the program £1695.38 more expensive than if delivered in a more rural area.

Table 2 Total costs and cost per child to deliver the Incredible Years Toddler Parenting Program over 12 weekly sessions with one health visitor and one child care practitioner as the group leaders. Initial training and supervision has been undertaken and materials purchased (see Table 1)

Type of cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Delivery costs:				
Engagement and recruitment of parents:				
Time for two group leaders spent in home visits to recruit parents including travel time	90 min per family	90 min per family £35.28	720 min per group £282.24	900 min per group £352.80
Time for two group leaders to make telephone calls recruiting parents	120 min	120 min per family £47.04	960 min per group £376.32	1,200 min per group £470.40
Administrative time for two group leaders to write and send out initial letter to parents	15 min for 1 letter	£5.88 in wages for 1 letter	£47.04 in wages to send letters to 8 families in first week	£58.80 in wages to send letters to 10 families in first week
Subtotal:			£705.60	£882.00
Group Costs: Mean (Standard Deviation)				
Time for two group leaders to prepare the room for the group	42 min (7.3)	42 min per week	504 min per program (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks	504 min per program (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks
Time for two group leaders to prepare for the session	120 min (0)	120 min per week	1,440 min per program (running for 12 weeks) £564.48 in direct wages to prepare group session for 12 weeks	1,440 min per program (running for 12 weeks) £564.48 in direct wages to prepare group session for 12 weeks
Group time for two leaders including travel time to and from the group	396 min per week (78.2) (198 min per week for one leader)	396 min per week (£155.23 wages for two leaders) 198 min per week (£77.62 wages for one leader)	4,752 min per program £1862.76 in wages to conduct group session including travel time to session	4,752 min per program £1862.76 in wages to conduct group session including travel time to session
Time for two group leaders for catch up/ home visits sessions	60 min (0)	60 min per week £23.52	720 min per program £282.24 in direct wages	900 min per program £352.80 in direct wages
Time for two group leaders to make telephone calls to parents	58 min (14.6)	58 min per week £22.74	696 min per program £272.88 in direct wages	870 min per program £341.04 in direct wages
Subtotal:			£3179.88	£3318.60
Provision of crèche facilities (salary of crèche staff)	£105.75 per week (67.3)	£105.75 per week	£1269.00 per program	£1269.00 per program
Taxis	0.00	0.00	0.00	0.00
Rental of halls	£60.83 per week (58.3)	£60.83 per week	£729.96 per program	£729.96 per program
Food and catering	£5.20 per week (1.8)	£5.20 per week	£62.40 per program	£62.40 per program
Other costs (e.g., photocopying)	£6.18 per week (2.9)	£6.18 per week	£74.16 per program	£74.16 per program
Subtotal:			£2135.52	£2135.52
Costs of delivering parenting group over a 12 week program:				
Total			£6021.00	£6336.12
Cost/child based on 8 parents per group			£752.63	£633.61
Cost/child based on 10 parents per group including additional recruitment letters, telephone calls, home visits, catch up visits and telephone call costs				

Table 3 Total costs and cost per child of set up and delivery of the Incredible Years Toddler Parenting Program over 12 weekly sessions delivered within a research trial with one health visitor and one child care practitioner as group leaders

Type of cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Set-Up Costs:				
Initial training costs:				
Materials (program materials)	1 pack of IY toddler program materials	£1027.89 for one pack of IY toddler materials (including Value Added Tax)	£1027.89	£1027.89
Training course fee	3 day training	£470.00 (including Value Added Tax) per leader	£940.00 (including Value Added Tax) for two leaders to attend training	£940.00 (including Value Added Tax) for two leaders to attend training
Leader wages for group leader to attend training	3 day training (7 h each day)	£493.92 for one leader	£987.84 in wages for two leaders to attend training	£987.84 in wages for two leaders to attend training
Supervision before start of program ("Set Up Day") costs:				
Supervision of group leaders before start of program including travel	1 day (7.5 h)	£350.00 (flat rate) for trainer wages to deliver supervision	£350.00	£350.00
Subtotal:			£3305.73	£3305.73
Delivery Costs:				
Engagement and recruitment of parents:				
Time for two group leaders conducting home visits to engage and recruit parents (including travel time)	90 min per family	90 min per family	720 min per group	900 min per group
		£35.28	£282.24	£352.80
Time for two group leaders to make telephone calls recruiting parents	120 min	120 min per family	960 min per group	1,200 min per group
		£47.04	£376.32	£470.40
Administrative time for two group leaders to write and send out initial letter to parents	15 min for one letter	£5.88 in wages for 1 letter to 8 families in first week	£47.04 in wages to send letters to 8 families in first week	£58.80 in wages to send letters to 10 families in first week
Subtotal:			£705.60	£882.00
Group Costs: Mean (Standard Deviation)				
Time for two group leaders to prepare the room for the group	42 min (7.3)	42 min per week	504 min per program (running for 12 weeks)	504 min per program (running for 12 weeks)
		£16.46	£197.52 in direct wages to prep a room for 12 weeks	£197.52 in direct wages to prep a room for 12 weeks
Time for two group leaders to prepare for the session	120 min (0)	120 min per week	1,440 min per program	1,440 min per program
		£47.04	£564.48 in direct wages to prepare group session for 12 weeks	£564.48 in direct wages to prepare group session for 12 weeks
Group time for two leaders including travel time to and from the group	396 min per week (78.2) (198 min per week for one leader)	396 min per week (£155.23 wages for two leaders) (£77.62 wages for one leader)	4,752 min per program	4,752 min per program
			£1862.76 in direct wages to conduct group session including travel time	£1862.76 in direct wages to conduct group session including travel time
Time for two group leaders for catch up/ home visits sessions	60 min (0)	60 min per week	720 min per program	900 min per program
		£23.52	£282.24 in direct wages	£352.80 in direct wages
Time for two group leaders to make telephone calls to parents	58 min (14.6)	58 min per week	696 min per program	870 min per program
		£22.74	£272.88 in direct wages	£341.04 in direct wages
Subtotal:			£3179.88	£3318.60

Table 3 (continued)

Type of cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Weekly supervision time for two group leaders	180 min attending supervision	180 min per week £70.56	2,160 min per program in supervision £846.72	2,160 min per program in supervision £846.72
Mileage to and from weekly supervision for two group leaders	Varied depending upon group leader location. 66 miles mean round trip.	£26.40 for the round trip (40p per mile)	£316.80 per program (travel to 12 supervision sessions)	£316.80 per program (travel to 12 supervision sessions)
Trainer costs (wages for delivering supervision)	180 min per session	£132.00 per session	£1584.00 per program in Supervisor wages	£1584.00 per program in Supervisor wages
Provision of crèche facilities (salary of crèche staff)	£105.75 per week (67.3)	£105.75 per week	£1269.00 per program	£1269.00 per program
Taxis	0.00	0.00	0.00	0.00
Rental of halls	£60.83 per week (58.3)	£60.83 per week	£729.96 per program	£729.96 per program
Food and catering	£5.20 per week (1.8)	£5.20 per week	£62.40 per program	£62.40 per program
Other costs (e.g., photocopying)	£6.18 per week (2.9)	£6.18 per week	£74.16 per program	£74.16 per program
Subtotal:			£4883.04	£4883.04
Costs of establishing and running parenting group over a 12 week program:				
Total			£12074.25	£12389.37
Cost/child based on 8 parents per group			£1509.28	
Cost/child based on 10 parents per group including additional letters, home visits, catch up visits and call costs				£1238.94
Costs of running parenting group excluding non-recurrent costs:				
Total			£8768.52	£9083.64
Cost/child based on 8 parents per group			£1096.07	
Cost/child based on 10 parents per group including additional recruitment letters, telephone calls, home visits, catch up visits and telephone call costs				£908.36

Discussion

This paper sets out for the first time a framework with clear steps for undertaking a micro-costing of a parenting program. From the micro-costing analysis example, and previous work we offer a number of recommendations. 1) Methods of gathering cost and resource use data (e.g., diaries) need to be developed by the research team in consultation with service staff and intervention providers. 2) Primary sources should be used to gather cost and resource data, through the completion of developed measures (e.g., diaries). 3) When costs are unavailable from primary sources (e.g., staff salaries) national costs should be used where available; if unavailable knowledge from intervention providers should be utilized. 4) Clear tables should be constructed from gathered data including each element of cost, its unit, and value. 5) Micro-costing analysis should be performed to calculate program delivery costs. 6) Sensitivity analysis should be conducted to test assumptions made in the micro-costing analysis by varying costs depending on group size, setting, context, or another adjustable variable.

This paper contributes to the field by furthering previous work by Kinsella (2004) and others (Drummond et al. 2005; Edwards et al. 2007; Griffith et al. 2004; Morris et al. 2007) through the development of a practical, stepped, framework, with its usefulness demonstrated through a worked example. This framework could facilitate the standardization of micro-costing of future parenting program delivery. The applied framework gained precision and accuracy by collaborating with key stakeholders and user groups, as suggested by Kinsella (2004). It is extremely difficult to account for every cost associated with a service, but by developing cost diaries we had a specific list of delivery program costs at ground level. The weekly completion of the diaries during the delivery of the program reduced the need for estimates.

Our case study illustrates for the first time national U.K. costs for the newly developed IY Toddler Parenting Program, delivered both as part of normal service delivery, and within a research trial, which highlighted differential costs depending on delivery, context, and setting. To set up and deliver the program as part of normal service delivery with eight parents per group it would cost £9326.73, which is £2747.52 less expensive than the costs of setting up and delivering the program as part of a research trial with eight parents per group (£12074.25). The additional costs associated with the set-up and delivery of the program within a research trial were created by additional weekly supervision sessions. Service managers and decision makers who are considering incorporating a new program into their menu of services would require cost information to establish whether their budget could support the set-up, delivery and roll out

of such a program (Tables 1 and 2). In contrast, service providers interested in assessing the clinical and cost-effectiveness of the program before roll-out, would require within their budget the means to set up and deliver the program under research contexts, with additional (weekly) supervision (Table 3).

Lessons from Sensitivity Analysis

Sensitivity analysis explored the extent to which the assumptions made were held, whilst adjusting key variables. This enabled allowances to be made for budgetary limitations, high demand from families, and target setting by an organization or Government policy. Sensitivity analysis established how the costs of the IY Toddler Parenting Program were affected by increasing group participants from 8 to 10. The IY series developer recommends that the number of parents in a group does not exceed 12 (Webster-Stratton and Reid 2010). The number of parents per group in this trial ranged from 7 to 10, with an average of 8 parents per group. The average number per group was used in the micro-costing exercise to calculate the average cost per parent. Sensitivity analysis showed the difference in cost per parent with increasing numbers, whilst keeping below 12 parents per group, as recommended by Webster-Stratton and Reid (2010). The costs per child fell when group size increased, which has implications for cost-effectiveness. If the program is delivered to a larger group at a lower cost, this could result in a higher cost-effectiveness ratio. Sensitivity analysis also demonstrated the effect of running the program in London U.K., a high-cost urban area in comparison to the predominantly rural delivery sites in Wales, U.K. Overall program costs increased by £1233.54 under normal service delivery and £1695.38 when conducted as part of a research trial when the London Multiplier was applied.

The highest-cost item (Tables 2 and 3) is group leader wage to engage/recruit parents and deliver the program; the second is provision of crèche facilities. Parents experience many barriers to attending a group, such as complications arranging child care and difficulties travelling. By providing crèche facilities parents have one less barrier to overcome. It is, therefore, a crucial additional cost that affects uptake and program completion by parents. The program was costed as being delivered by one health visitor and one child care practitioner. Costs would increase if the groups were run by two health visitors, as their wage is higher than that of a child care practitioner. Service managers may feel it is sensible to train lower paid staff in an attempt to reduce costs; however, qualified, trained, staff with the appropriate background are required to deliver the

program well and achieve positive outcomes. The IY Toddler Parenting Program is a 2–2.5 h a week program, delivered by two group leaders, but staff time to prepare and deliver one weekly session, and make catch up telephone calls or home visits results in approximately 11 h of staff time, (i.e., 1.5 days per week is required to deliver a 2–2.5 h session).

Strengths

This paper is the first to provide a framework and worked micro-costing example of a parenting program for children under 3 years old. Previous micro-costing exercises of parenting programs have used varied methods and given little detail of their decision making processes and selection of cost elements. In contrast, this paper offers a framework detailing how the costs of the program were collected, labelled and divided into categories; beginning with defining the perspective of analysis, through to the use of leader cost diaries to construct Tables 1, 2 and 3.

Precise and accurate costs were gathered by diaries developed in partnership with the IY Wales Centre and group leaders. Diaries were completed weekly by leaders; therefore, reducing the need for estimates. By using cost diaries we were able to compile a list of program delivery costs based upon group leaders' direct experiences of delivering the program. This article sets out the total program costs of the 12-session IY Toddler Parent Program within the three contexts of initial set-up of the program as part of normal service delivery with newly trained leaders, the subsequent delivery of the program with initial training and supervision undertaken and materials purchased, and the set-up and delivery of the program within a research/development context with newly trained (uncertified) leaders. By separating the costs in this manner the reader can find the appropriate cost of the program based upon their need.

Limitations

Using the framework in this instance highlights context-bound cost issues; for example, leader travel costs to attend weekly supervision. Under research contexts (Table 3) groups were run in rural Wales, U.K., where long distances were travelled suggesting the presented costs may be higher than in urban settings. Supervision was delivered in two main areas—North and South Wales, U.K., to reduce travel costs as much as possible. However, a small number of group leaders in Mid Wales, U.K., had to travel a few hours to one of the North or South locations to receive supervision. This is important for policy as well as costs, as reductions in costs and increased fidelity could be achieved through each location having an accredited leader who could provide supervision in their local areas.

Although viewed as a strength, the use of diaries as the primary method to gather costs had potential risks. There was the possibility that the leaders may miss hidden costs or be unable to identify specific categories of costs such as administrative costs. We minimized this potential risk by listing activities such as the purchase of raffle prizes, felt-tip pens, paper, and photocopying as examples under the heading of 'administrative costs' in the diary, and by involving group leaders in the development of the cost diaries.

Future Research

In our view, the main unanswered question in micro-costing is how and why researchers define and choose certain parameters when conducting their micro-costing. The lack of detail in previous published studies leaves unanswered questions as to why the researchers chose a particular perspective, and the inclusion/exclusion of certain elements and costs. Further detail and explanation of the methodology adopted by researchers conducting micro-costing exercises is required for transparency, as a lack of cost detail could lead to inaccurate further analysis such as cost-effectiveness analyses. Accurate cost data needs to be integrated with outcome data, to explore if and how outcomes vary by cost, by performing further economic evaluations; for example, cost-effectiveness and cost-benefit analysis after micro-costing analyses. There is a need for standardization in micro-costing; this standardization will provide researchers with a guide of what typically should be included when performing micro-costing. We have provided the cost diary used in the trial as [Supplementary material](#) in order to facilitate standardization of future micro-costing exercises of parenting programs.

Conclusion

This paper describes the rationale for, and value of, micro-costing parenting programs as upstream public health prevention programs not only for researchers who may be conducting economic evaluations alongside RCTs, but also for service managers and decision makers. The suggested framework addresses issues such as accuracy and sensitivity analysis, and highlights the lack of economic research conducted in this field. The method and steps of the micro-costing performed on the IY Toddler Parenting Program are based on accuracy, precision, collaboration, and definition of the scope of analysis before beginning the micro-costing (Edwards et al. 2007; Griffith et al. 2004; Kinsella 2004).

Researchers need to be transparent, clear, accurate, and detailed in their micro-costing to inform and

improve micro-costing methodology. Micro-costing is a useful economic tool; if conducted accurately it can help to support standardization in the field of health economics, future economic evaluations, research, and intervention delivery. We present a framework, detailed steps, and a cost diary template to facilitate the standardization of micro-costing of parenting programs, which has not previously been offered. The framework may also have applications to other settings and programs such as preventative school-based interventions.

Key Messages

- Micro-costing is important and forms the bedrock of accurate cost-effectiveness and cost-benefit analyses.
- There is increased policy interest in the cost-effectiveness of upstream programs and interventions in the current economic climate. Economic evaluations of complex interventions such as parenting programs are needed to inform service managers and decision makers.
- Economic evaluations should be undertaken as standard alongside RCTs of clinical effectiveness to show potential cost-effectiveness or cost-benefits of a program or intervention.
- Researchers need to consider lessons learnt from previous micro-costing exercises such as the need for accuracy, precision, collaboration, choosing the perspective and defining the parameters of the micro-costing in order to develop the technique further.
- A standardization in the methods of micro-costing is required to bring transparency to the method, allowing for comparison between different programs or interventions.

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