Out-of-home day care for families living in a disadvantaged area of London: economic evaluation alongside a RCT

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The authors assessed out-of-home day care for young children. The care involved attendance at an Early Years day care centre.

Type of intervention
Other: encouraging parents living in disadvantaged areas to return to work through enabling access to child care.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised families living in a disadvantaged area of London.

Setting
The setting was the community in Hackney, London, UK. The economic study was carried out in the UK.

Dates to which data relate
The dates during which the effectiveness and resource use data were collected were not reported. However, the methods and main results of the associated trial were reported to have been published elsewhere (Toroyan et al. 2003 and 2004, and Wiggens et al. 2003, see 'Other Publications of Related Interest' below for bibliographic details). The unit costs were reported in 2000 prices and were calculated from data from the Early Years Centre for 1999-2000.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of families that participated in the effectiveness study.

Study sample
The study sample included families with a child on the waiting list for the Early Years day care centre in Hackney. There were criteria that enabled a family to be eligible for the Early Years Centre, but these were not specified. There was no report that power calculations were carried out to estimate or reduce the impact of chance on the results. A total of 137 families participated in the trial. There were 62 families in the intervention group and 75 in the control group (the control group comprised families that did not receive care from the Early Years Centre). Although it was unclear from the present paper whether the families actually lived in a deprived area or were from deprived backgrounds, it is
possible that this information may be available from the parent study.

**Study design**
The analysis was based on a randomised controlled trial (RCT) in which families on the waiting list for the Early Years Centre were randomised to either receive or not receive child care at the Early Years Centre. The control group therefore comprised families making other arrangements for child care. The families were followed up at 9 and 18 months after randomisation. There was no reported loss to follow-up.

**Analysis of effectiveness**
The analysis was based on the actual care used by each family, as reported in parental questionnaires. The primary outcome was the proportion of mothers in paid employment or education at 18 months. The secondary outcomes related to maternal depression, household income, child development, and infection and injury rates. The authors did not report a comparison of the groups at baseline. However, the statistical analysis referred to adjusting for baseline differences in paid employment, suggesting a statistical difference between groups for this variable.

**Effectiveness results**
After 18 months' follow-up, participation in paid employment or study was 67% in the intervention group and 60% in the control group (adjusted absolute risk reduction 0.13, 95% confidence interval, CI: -0.05 to 0.32).

Participation in paid employment only was 52% in the intervention group and 53% in the control group (adjusted absolute risk reduction 0.07, 95% CI: -0.12 to 0.28).

Twenty-two per cent of mothers in the intervention group and 29% of mothers in the control group were likely to be above the poverty line.

No other clinical outcomes were reported in the present paper.

**Clinical conclusions**
The authors concluded that high-quality day care increases maternal employment.

**Measure of benefits used in the economic analysis**
The authors used the additional number of women in paid employment observed during the clinical study as their summary measure of health benefit.

**Direct costs**
The costs were estimated from the perspectives of society and the health care provider. The analysis focused on the costs of Early Years education and care, health service use for mothers and children, productivity gains (see 'Indirect Costs') and other contributions associated with the parents (e.g. travel costs and medications). Health service use for mothers and children included general practitioner (GP) visit, inpatient hospital day, outpatient hospital visit, GP/nurse home visit, midwife and social worker.

The resource use data were collected from the parents involved in the clinical effectiveness study via questionnaires completed at 9 and 18 months post randomisation. Assumptions were made about travel costs. The observed quantities were then multiplied by the unit costs derived from a detailed unit costing study carried out by the authors. This latter study considered costs at the Early Years Centre and other local child care providers, including local authority provision, private day nurseries, and less formal care providers such as childminders and playgroups.

The costs were inflated, where appropriate, to 2000 values using the Hospital and Community Services pay and prices index for health care services and the retail price index for other costs. The costs were discounted at a rate of 6%.
Statistical analysis of costs
CIs for differences in mean costs were estimated using repeated sampling (bootstrapping). Statistics were calculated using STATA software (Stata Corporation, College Station).

Indirect Costs
The societal perspective adopted required that the authors considered wider costs and benefits to the community and, as such, the authors considered the increased productivity of parents as a result of increased employment. These gains were estimated using data on employment from the parental questionnaires; assumptions were made about wages. The assumptions were tested during the sensitivity analysis. Gains were discounted and reflated, as with the direct costs.

Currency
UK pounds sterling (€).

Sensitivity analysis
One-way sensitivity analyses were used to explore the impact of key assumptions on the results. In particular, the authors varied the discount rate, the incorporation of capital investment costs, the inclusion of partners' income, child age (in the calculation of nursery costs), the costs of informal child care by relatives and friends, and the use of the minimum wage rather than the average wage to value productivity gains. The authors used cost-effectiveness acceptability curves to understand and demonstrate the impact of uncertainty on the results.

Estimated benefits used in the economic analysis
Please refer to the benefits reported from the effectiveness study.

Cost results
The mean total amount of formal and informal care used was 29.01 (standard deviation, SD=12.09) hours for the intervention group and 19.08 (SD=16.4) hours for the control group. The difference was 9.22 hours (95% CI: 3.57 to 14.02). The authors reported that this difference was driven by the use of formal care, which was 20 hours using centre-based day care in the intervention group and 4 hours using local authority day care in the control group.

The total public sector costs per woman were 4,150 in the intervention group and -1,056 in the control group (a cost-saving), giving a difference of 5,064 (95% CI: -2,052 to 12,180).

The total societal costs per woman were -26,475 (a cost-saving) in the intervention group and -26,320 (a cost-saving) in the control group, giving a difference of -837 (95% CI: -12,440 to 10,767).

Synthesis of costs and benefits
The authors noted that a greater positive impact on employment was seen in the intervention group. In addition, although from a societal perspective both intervention and control groups were associated with cost-savings, the intervention offered greater savings to society. On this basis the authors reported that the Early Years Centre intervention was the "dominant" alternative.

From the public sector perspective, the intervention day care centre was more costly than the alternative care options. Therefore, an incremental cost per additional mother in employment or education was calculated. The cost of achieving an additional mother in employment in the intervention group was 38,550 (85% CI: 1,273 to 416,172).

The two most important factors identified during the sensitivity analysis were the impact of partners’ employment and the assumption of mothers returning to work at the average wage.
Authors' conclusions
"Day care increases maternal employment at no increased cost to society although the cost to the public sector was higher and both results were imprecise."

CRD COMMENTARY - Selection of comparators
The analysis considered Early Years day care compared with alternative local services used by parents. These alternative services represented care that the parents chose if Early Years care was not available or a place was not offered and, therefore, represent an empirical comparator that would apply to various different settings.

Validity of estimate of measure of effectiveness
The authors designed an RCT. This design aims to reduce systematic differences between comparator patient groups. Summary statistics were not presented for the two groups, thus it is not possible for the reader to assess whether the groups were indeed comparable at baseline. The sample of families used in the study was taken from those on the waiting list for the Early Years Centre. It is not clear whether this sample was representative of the study population (deprived families) as summary statistics were not reported. Moreover, the sample was selected from families opting to join a waiting list for child care and might not represent the majority of deprived families. The authors noted in their discussion that more than half of the women in the study were already working; this statistic suggests that the families included did not necessarily represent the most deprived in society. The authors carried out a study that was useful in helping the reader to understand some factors important in increasing maternal employment.

Validity of estimate of measure of benefit
The estimation of benefits was taken directly from the effectiveness analysis. It represented a sensible and empirical comparator that could be compared with other interventions aimed at increasing maternal employment.

Validity of estimate of costs
The costs were estimated from two perspectives and estimates relevant to these two perspectives were included. The analysis might also have been enhanced by adopting the perspective of the individual family, as uptake and continuation of Early Years Care may well be affected by the implications to the family; consideration of this perspective may have wider implications. The authors carried out an extremely detailed unit costing analysis that may well prove useful to many readers and provide a useful input in to future analyses. However, there were some problems in the calculation of the total costs and the results and conclusions drawn. This might have been due to the extremely difficult nature of this subject, the differing perspectives adopted, and the fact that this was the first study to examine this subject.

The authors noted that the results were sensitive to partners' earnings. Since information on partners' employment was not available at baseline, these data should not have been included in the post randomisation comparisons and used to draw conclusions; there is uncertainty about whether partner employment is related in any way to maternal employment or the use of child care facilities. There may have been no change in partner employment over the duration of the study yet the authors presented results and drew conclusions that related to this aspect (and therefore relied heavily on implicit assumptions). The authors concluded that the "minimum wage is a poor return for a women's time given the cost of high quality child care as a substitute for that time" but this conclusion is unfounded.

The costs and the quantities were reported separately, which will enhance the generalisability of the authors' results. Extensive sensitivity analyses were carried out on the cost parameters. Discounting was not relevant, as the costs were incurred during less than 2 years, but was performed. The price year was reported, which will aid any future inflation exercises.

Other issues
This was reported to be the first study to assess this difficult topic, but nevertheless the authors were able to make some comparisons with previous work. For example, the authors stated that their costing analysis was comparable to previous studies in this field. They also noted that they had confirmed the results of other studies which had indicated that high-
quality care is more costly than other forms of care. The issue of generalisability to other settings was not explicitly addressed. Generalisability was limited by the use of local cost estimates and the fact that the analysis was based on a local scheme aimed at increasing maternal income. However, generalisability could be assessed and established by comparing the local costs with those available nationally.

The authors acknowledged the relatively "short run" nature of the study as a limitation, and in particular highlighted that the benefits of high-quality child care are difficult to measure and may not be returned until the child is of age. In this case, increased maternal employment is an incomplete measure of outcome for the benefits associated with high-quality child care.

**Implications of the study**
The authors did not make any recommendations resulting from their study, but the need for extensive work in this field is clear.

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None stated.

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**Other publications of related interest**


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