# UNDERSTANDING THE COSTS OF FAMILIES CAUGHT IN A CYCLE OF MULTIPLE RISKS

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## Abstract

This paper estimates the costs of dealing with families with multiple risks factors in England. In doing so, we develop a costing model, including cost sharing, that is applied to data on the number of families living with multiple indicators of deprivation which is obtained from two national databases: the Millennium Cohort Study and the national Longitudinal Survey of Young People in England. From the data, we obtained proportion of families living with multiple risks as well as the most common patterns of risks. Using this information and the unit cost for the government for dealing with these risks, we estimate the total cost for the government. This cost, however, assumes that each risk factor is dealt by practitioners separately (i.e. a health practitioner deals with the problems of depression, whereas a social worker deals with problems of criminality). Public expenditure could be reduced if there is cost sharing for risk factors, which implies a holistic approach for tackling multiple deprivation. The paper provides an estimate of the potential cost reduction under cost sharing scenarios.

## Resumen

Este artículo investiga el costo para el Gobierno Británico de proveer servicios de apoyo a familias que sufren de múltiples riesgos. Para ello, es necesario obtener una estimación del número de familias que sufren de múltiples riesgos y aplicar a tales estimaciones un modelo del costo de apoyo para combatir estos problemas. Usando dos bases de datos nacionales, el Millennium Cohort Survey y el Longitudinal Survey of Young People in En-

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gland, se obtuvo la prevalencia de las familias que sufren de múltiples riesgos y los patrones de riesgos más comunes. A estos riesgos se aplicó el costo unitario para proveer apoyo. Sin embargo, el costo unitario supone que estos problemas se solucionan de forma individual, es decir, se combate la depresión de forma aislada al combate del alcoholismo. El gasto público pudiera ser menor si el problema de múltiples riesgos se combate de manera integral. El presente artículo investiga la reducción potencial para el gasto público de llevar a cabo intervenciones integrales.

Palabras clave: *Cost, multiple deprivation, England.*
Clasificación Jel: h53, d61.

## Introduction

It has long been recognised that there can be undesirable outcomes in later life for children who are exposed to adversity as they are growing up. In the UK, the consequences of exposure to multiple risks have been investigated for children born in 1958 and in 1970 using the British birth cohort studies. For instance, early exposure to multiple risks in childhood has cumulative effects throughout the life course, influencing both behavioural adjustment during childhood and psychosocial functioning during adulthood (Schoon, Sacker and Bartley, 2003; Schoon, 2006), as well as occupational attainment in adulthood [Bynner, Joshi and Tsatsas (2000). Sacker, Schoon and Bartley (2003)] further point out that exposure to multiple risk is related to social inequalities more than to class inequalities and that the former is more predictive of educational achievement in early adulthood.

Whilst this evidence provides an insight into the undesirable outcomes for these individuals from growing up on families with multiple risk factors. To date there has been no agreed definition of what constitutes multiple deprivation or multiple risks and what direct or wider costs are attributable to them. This paper sets out to provide an estimate of the costs for the government and society for helping families with multiple deprivation. In doing so, we have applied a costing model to our estimate of the number of children living in families with multiple risks that is obtained using data from the Millennium Cohort Study (MCS) and the national Longitudinal Survey of Young People in England (LSYPE). In addition, the paper also provides two scenarios for potential cost sharing in dealing with the problems of multiple deprivation for families and the potential cost savings for the public pursue of dealing with the problem of multiple deprivation in a more holistic manner.

## *Identifying risk factors*

There are a number of domains where risk factors have been identified in earlier studies. These domains vary considerably from one study to another. *The Audit Commission* (2005) drew up 33 life indicators under a smaller set of domains.[1] The *PSE* study (Gordon, *et al.*, 2000) drew up 8 indicators with which to calculate a multiple deprivation index for all households.[2] Burchardt (*et al.*, 2002) calculated multiple deprivation using 4 domains,[3] Taylor (2005) using 10 indicators, Barnes (2005) using 7 dimensions. Levitas (*et al.*, 2007) recent review on multiple risks points to the plethora of domains used and is critical of this free-for-all. They go on to offer another new set of 10 domains which, although these clearly have overlaps with earlier sets, are more comprehensive.[4] However, researchers are always constrained by the data that are available. None of the earlier studies focus on very young children and none cover ethnic minority families adequately, although some studies have listed 'ethnicity' as a risk factor (Levitas, 2007). The 1999 government *Opportunities for All* framework suggested 60 indicators to measure social protection, but these are divided up into age groups; children under 16 is one of the categories. However, this is still a very broad heading under which to consider children's development. The *Every Child Matters Agenda* (DfES, 2006) mentions 5 domains important for children: being healthy, safety and security, enjoying and achieving, social and civic participation, and economic well being. What is missing from all of these discussions is the principles needed to identify the appropriate domains.

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1 The domains were income deprivation, employment deprivation, health deprivation and disability, education, skills and training deprivation, barriers to housing and services, crime, and livening environment deprivation.

2 The 8 domains consist of: (1) not in paid work, (2) lives in jobless household, (3) excluded from 3 services because they are unaffordable or unavailable, (4) does not participate in 5 or more social activities for any reason, (5) has no daily contact with either friend or family, (6) has poor support on 4 or more indicators, (7) not currently or in the past 3 years involved in civic or political activities including voting, (8) poor on income or subjective poverty. On these indicators 24% of British households had no experience of any of them, and 10% had experience of 5 or more.

3 These 4 domains consisted of: (1) consumption or low income, (2) production or socially valued activity, (3) political engagement, (4) social interaction. As applied to the population of Great Britain using BHPS data, 61.6% were not excluded on any dimension, and 9.8% were excluded on 2 or more dimensions.

4 The Bristol domains are part of a matrix consist of: (1) material/economic resources, (2) access to public and private services, (3) social resources, (4) economic participation, (5) social participation, (6) culture education and skills, (7) political and civic participation, (8) health and well being, (9) living environment, (10) crime, harm and criminalisation.

We consider that the most important question in making a choice of risk factors is: Who are the subjects? The risk factors need to be suited to the age and population groups being considered. Appropriate risk factors are likely to vary across different age, lifecourse or populations groups. Risk factors and risk domains also need to be chosen in the light of existing research on outcomes and this means that the set of risk factors may change over time as new research on unfavourable outcomes from a particular experience comes to light.

In this paper we focus on risks met the following two criteria: there are known costs to the exchequer in managing or dealing with each problem and that there is published research available on both the direct and indirect costs of each problem area. The risk factors used in this cost and impact model are:

- Depression
- Alcohol misuse
- Domestic violence
- Homelessness
- Being in care
- Criminality

*Datasets*

The Millennium Cohort Study and the Longitudinal Study of Young People in England were available for this investigation. MCS is a large-scale longitudinal survey of, at the outset, 18,818 of the new century's babies in 18,552 families who are bringing them up in the four countries of the UK. Its first sweep was carried out during 2001-2002 by interviewing parents when the babies were aged nine months. The sample design allowed for disproportionate representation of families living in areas of child poverty in all of the four UK countries, along with oversampling in the 3 smaller UK countries of Northern Ireland, Scotland and Wales and oversampling in areas with high minority ethnic populations in England (Dex and Joshi, 2004). These nationally representative large-scale data not only provide a set of important risk indicators appropriate for young child, but also they allow us to calculate the extent of such risk exposure for the population of UK children as a whole as well as children in the four countries of the UK.

The LSYPE is a major new longitudinal study of young people in Britain. The purpose of LSYPE is to chart the progress of a cohort of young people who had been exposed to new government policies directed at young people such as the new Connections Service and Educational Maintenance Allowances (EMAs). The study follows a large cohort of young people (up to 20 thousand), initially contacted at age 13/14 and to be followed-up every year into their mid-twenties. The sample has been boosted to ensure adequate representation of ethnic minorities

(up to 5 thousand) young people living in disadvantaged areas. The first sweep of information was collected in 2004.

Table 1 shows descriptive statistics for indicators of risk in the MCS for England. For Depression, 20.2% of children born in 2000 live in families where either the mother or the partner often feels depressed; 7.2% of these children live with parents at risk of alcoholism (defined as 21 units of alcohol consumed per week for women and 28 units of alcohol consumed per week for men), and 5.6% live with parents who get into violent rage. Of the Millennium cohort children, 0.24% live with parents who were incarcerated before the age of 17 or were in prison at the time of the survey, 0.48% of households had given a child in-care or adoption and 0.53% of the mothers had experienced a period of homelessness since the child was born (defined as moving out of a place and having nowhere permanent to live).

**Table 1**
Descriptive statistics for 6 indicators of risk (MCS)

| Risk | Description of variable in MCS | Observations | Mean (%) | Linearised S.E. (*100) |
|---|---|---|---|---|
| ■ **Depression** | Either the mother or partner often feel miserable or depressed. | 11,012 | 20.25 | 0.60 |
| ■ **Alcohol** | Either the mother consumes over 21 units of alcohol per week or partner consumes over 28 units of alcohol per week. | 11,527 | 7.24 | 0.40 |
| ■ **Domestic violence** | Either mother or partner often get in violent rage. | 7,903 | 5.58 | 0.27 |
| ■ **History of criminality** | Mother or partner had been in prison before age 17 or currently in prison. | 11,531 | 0.24 | 0.05 |
| ■ **Having a child in care** | Household had given a child into care or adoption. | 11,008 | 0.48 | 0.08 |
| ■ **Homelessness** | Mother had experienced homelessness since MCM was born. | 11,531 | 0.53 | 0.10 |

Source: Millennium Cohort Survey (MCS), Sweep 1.

Table 2 shows descriptive statistics for indicators of risk in the LSYPE. For health, 4.7% of 14 year olds live with parents who reported not very good health status, 3.2% of 14 year olds drink alcohol more than 3 times per month, and 9.1% of 14 year olds quarrel most days with either the mother or the father. Furthermore, 8.6% of the parents had been contacted by the police due to the young person's

actions, 2.3% of 14 year olds had been in care and 0.12% lived in a bed and breakfast or in an institution at the time of the survey.

**Table 2**
Descriptive statistics for 6 indicators of risk (LSYPE)

| Risk | Description of variable in MCS | Observations | Mean (%) | Linearised S.E. (*100) |
|---|---|---|---|---|
| ■ **Health** | Either the mother or the father reported "not very good" health status. | 15,495 | 4.70 | 0.17 |
| ■ **Alcohol misuse** | YP drinks alcohol more than 3 x a month. | 15,123 | 3.20 | 0.14 |
| ■ **Domestic violence** | Either the mother or the father quarrel most days with the YP. | 14,151 | 9.06 | 0.24 |
| ■ **History of criminality** | Main parent had been contacted by police due to YP´s actions. | 14,060 | 8.59 | 0.24 |
| ■ **Having a child in care** | YP had ever been in care. | 14,122 | 2.26 | 0.13 |
| ■ **Homelessness** | YP lived in B&B or Institution. | 15,666 | 0.12 | 0.03 |

Source: Longitudinal Study of Young People in England (LSYPE), Sweep 1.

We highlight that indicators of risk are different in these datasets. We do not have information on Depression in the LSYPE and instead we used self-reported health status. Risk of alcoholism is measured in the MCS according to units of alcohol consumed for parents, whereas the LSYPE provides an indication for alcohol consumption for 14 year olds (i.e. drinking more than 3 times per month). Domestic violence in the MCS is measured by parents getting often in violent rage, whereas in the LSYPE is measured by parents and young person quarreling most days. History of criminality in the MCS is measured by the either of the parents being in prison before the age of 17 or currently being in prison, whereas for the LSYPE is whether the parents of the young person have been contacted by the police due to the young person's actions. Care in both datasets is measured similarly. However, for the MCS we used whether any children of the family had been given into care or adoption whereas for the LSYPE is measured as the young person's being taken into care during his/her lifetime. Finally, homelessness in the MCS is measured by the mother experiencing a time having nowhere permanently to live whereas for the LSYPE is measured by the young person currently living in a bed and breakfast or in an institution.

*Prevalence of multiple deprivation*

In order to obtain the number of households living with multiple risks we multiple the estimated proportion by the size of the population. For the MCS, we use the total number of children under the age of 1 year old in 2000 in England, 574 thousand (Office of National Statistics, Quarterly Population Trends). This provides a rough approximation of the total number of children born in 2000 living in families with multiple deprivation. In England, approximately 121,000 children born in 2000 live in families that have at least one or more of these risk factors. Of the cumulative risks, we estimate that nearly 20 thousand children born in 2000 live in families with two or more risk factors, and 1.2 thousand with 3 or more risk factors (Table 3).

**Table 3**
Total number of 0-1 year old children in England living in families with multiple risks

| Numb of risks | Average | Linearised S.E. | Number of 0-1 children | Lower bound | Upper bound |
|---|---|---|---|---|---|
| 1 risk or more | 0.222 | 0.006 | 127,695 | 121,381 | 134,009 |
| 2 or more | 0.039 | 0.002 | 22,123 | 19,753 | 24,493 |
| 3 or more | 0.003 | 0.001 | 1,962 | 1,244 | 2,681 |

Source: Millennium Cohort Study (MCS), Sweep 1.

We use the estimated proportion of children born in 2000 and some strong assumptions to estimate the number of families in England living in multiple deprivation. The first assumption is that the proportion of children living in families with multiple risks is constant across all age groups and indicated by the proportion of 0-1 year olds in the MCS living in such circumstances. This means that the total number of 0 to 15 year old children living in families with multiple risks is obtained by multiplying the number of 0 to 1 year olds by 15. To obtain an estimate of the number of families, this figure for the number of children has to be adjusted by household size. In order to do this, we obtain the average number of 0 to 15 year olds living in households at each level of multiple risk, using the MCS data. The estimated number of families in England living with two or more risks is 160 thousand and 1.6 thousand live with three or more risks.

**Table 4**
Estimated number of families in England living in multiple deprivation

| Numb of Risks | Number of 0 to 1 year old children | Number of 0-15 years old children | Average number 0-15 children | Estimated number of families |
|---|---|---|---|---|
| risk 1 plus | 127,695 | 1,915,428 | 2.04 | 937,257 |
| risk 2 plus | 22,123 | 331,841 | 2.07 | 160,155 |
| risk 3 plus | 1,962 | 29,436 | 2.53 | 11,647 |

Source: Millennium Cohort Study (MCS), Sweep 1.

With the LSYPE, to estimate the total number of 14 year olds living in families with multiple indicators of risk we use the total number of pupils in Year 9 in schools (both maintained and independent and including special schools and Pupil Referal Units) in England in spring 2004 (645,840 pupils). This number excludes boarders, those in the UK solely for educational reasons, and pupils in small schools (defined as less than 10 year 9 pupils in maintained schools, or less than 6 year 9 pupils in independent schools). In England, approximately 141 thousand young people aged 14 live in families that have at least one or more of the 6 risk factors indicated above. Of the cumulative risks, we estimate that 19 thousand live with two or more risk factors, and 1,700 with 3 or more risk factors (Table 5).
With the LSYPE, we estimate the total number of families in England living with

**Table 5**
Total number of 14 year old in England living in families with multiple risks

| Numb of Risks | Average | S.E. | Number of 14 children | Lower bound | Upper bound |
|---|---|---|---|---|---|
| 1 risk or more | 0.226 | 0.003 | 146,144 | 141,840 | 150,448 |
| 2 or more | 0.033 | 0.001 | 21,038 | 19,212 | 228,643 |
| 3 or more | 0.004 | 0.000 | 2,305 | 1,691 | 2,918 |

Source: Longitudinal Study of Young People in England (LSYPE), Sweep 1.

multiple deprivation following the same procedure and assumptions used with the MCS. The estimated number of families in England living with two or more risks is 144 thousand and 15.2 thousand live with three or more risks (Table 6).

**Table 6**
Estimated number of families in England living in multiple deprivation

| Numb of Risks | Number of 14 year old children | Number of 0-15 years old children | Average number 0-15 children | Estimated number of families |
|---|---|---|---|---|
| risk 1 plus | 146,144 | 2,192,154 | 2.08 | 1,053,920 |
| risk 2 plus | 21,038 | 315,568 | 2.18 | 144,756 |
| risk 3 plus | 2,305 | 34,571 | 2.27 | 15,230 |

Source: Longitudinal Study of Young People in England (LYPSE), Sweep 1.

Whilst we could be fairly confident about the estimated number of families living with multiple risks as we obtain vary similar results using the MCS and the LSYPE. In fact, this similarity is perhaps more by chance because the two datasets are compiled and derived in different ways as they are based upon different indicators.

*Unit costs*

For the purposes of this model, the costs used were researched from available and published evidence The subsequent results of this model are therefore only indicative of what the actual or true costs may be. Annex 1 details the specific costings used in this paper. The units costs derived from this research are set out below:

**Table 7**
Estimated Unit Costs (£)

| | Total Unit Cost | Direct Cost | Indirect Cost |
|---|---|---|---|
| **Depression** | 3,541 | 139 | 3,263 |
| **Alcohol** | 3,739 | 2,475 | 1,264 |
| **Violence** | 13,451 | 1,731 | 11,720 |
| **Crime** | 6,119 | 5,878 | 242 |
| **Care** | 32,887 | 36,152 | n.a. |
| **Homelessness** | 27,950 | 24,500 | 3,450 |

*Risk patterns*

Using the MCS, we estimate the number of families living with multiple risk factors for each of the possible combinations of risks and the associated cost. From

Table 8 we estimate that 70.7 thousand families live with risk of depression and domestic violence. This corresponds to 48% of all families living with 2 risks. The estimated cost for dealing with these risk factors is £1.2 billion.

**Table 8**
Combinations of risks for families with 2 risk factors (MCS)

| Number of families | Percent | Depression | Alcohol | Violence | Crime | Care | Homeless | Estimated cost (millions £) |
|---|---|---|---|---|---|---|---|---|
| 70,675 | 47.59 | x | | x | | | | 1,200.9 |
| 57,903 | 38.99 | x | x | | | | | 421.6 |
| 7,782 | 5.24 | | x | x | | | | 133.8 |
| 3,119 | 2.1 | x | | | | | x | 98.2 |
| 2,807 | 1.89 | x | | | | x | | 102.2 |
| 1,559 | 1.05 | | | x | | | x | 64.6 |
| 1,559 | 1.05 | x | | | x | | | 15.1 |
| 936 | 0.63 | | | x | | x | | 43.4 |
| 936 | 0.63 | | x | | | x | | 34.3 |
| 624 | 0.42 | | x | | x | | | 6.1 |
| 312 | 0.21 | | | | | x | x | 19.0 |
| 312 | 0.21 | | x | | | | x | 9.9 |

Source: Millennium Cohort Study (MCS), Wave 1. Notes: the sample contains 148,523 living in families with 2 risk factors only.

From Table 9 we estimate that 9 thousand families live with risk of depression, alcoholism and domestic violence. This corresponds to 77% of all families living with 3 or more risks. This high percentage is expected as the prevalence for the other indicators of risk is relatively low. For this combination of risk, the estimated cost is £187 million (Table 9).

**Table 9**
Combinations of risks for families with 3 or more risk factors (MCS)

| Number of families | Percent | Depression | Alcohol | Violence | Crime | Care | Homeless | Estimated cost (millions £) |
|---|---|---|---|---|---|---|---|---|
| 9,010 | 77.36 | x | x | x | | | | 186.8 |
| 879 | 7.55 | x | x | | x | | | 11.8 |
| 439 | 3.77 | x | | x | x | | | 10.1 |
| 439 | 3.77 | x | x | | | x | | 17.6 |
| 220 | 1.89 | x | | x | | | x | 9.9 |
| 220 | 1.89 | x | | x | | x | | 11.0 |
| 220 | 1.89 | x | x | x | | x | | 11.8 |
| 220 | 1.89 | x | x | x | x | | | 5.9 |

Source: Millennium Cohort Study (MCS), Wave 1. Notes: the sample contains 11,648 living in families with 3 or more risk factors.

We also estimated the patterns of risk using the LSYPE. Notice that the indicators of risk used in the LSYPE are different than the ones use in the MCS. Another point worth highlighting with the LSYPE is that we do not have information on Depression but on self-reported Health status. For this costing exercise we utilize the cost of Depression as a proxy to estimate the cost of poor health. From Table 10 we estimate that 35 thousand families live with risk of domestic violence and have been contacted by the police due to the young person's actions. This corresponds to 27% of all families living with 2 risks. The estimated cost for dealing with these risk factors is £692 million.

**Table 10**
Combinations of risks for families with 2 risk factors (LSYPE)

| Number of families | Percent | Poor health | Alcohol | Violence | Crime | Care | Homeless | Estimated cost (£ millions) |
|---|---|---|---|---|---|---|---|---|
| 35,348 | 27.29 | | | x | x | | | 691.8 |
| 20,802 | 16.06 | x | | x | | | | 353.5 |
| 18,717 | 14.45 | x | | | x | | | 180.8 |
| 14,559 | 11.24 | | x | x | | | | 250.3 |
| 13,367 | 10.32 | | x | | x | | | 131.8 |
| 10,699 | 8.26 | | | | x | x | | 417.3 |
| 5,945 | 4.59 | | | x | | x | | 275.5 |
| 4,754 | 3.67 | x | x | | | | | 34.6 |
| 2,668 | 2.06 | x | | | | x | | 97.2 |
| 2,085 | 1.61 | | x | | | x | | 76.4 |
| 298 | 0.23 | | | | | x | x | 18.1 |
| 298 | 0.23 | | | | x | | x | 10.1 |

Source: Longitudinal Study of Young People in England (LSYPE), Wave 1. Notes: the sample contains 129,539 living in families with 2 risk factors.

From Table 11 we estimate that 3.8 THOUSAND families reported poor health, quarrelling with the young person and being contacted by the police due to the young person's actions. This corresponds to 25% of all families living with 3 or more risks. For this combination of risk, the estimated cost is £88 million.

The estimated cost of dealing with multiple deprivation in England using indicators from the MCS is £7.1 billion (Table 12). The estimated cost of dealing with multiple deprivation in England using indicators from the LSYPE is £12.2 billion (Table 12). As is shown in our analysis, the total cost decreases as the number of risks increases. This is because there is less prevalence. However, the average cost increases due to the severity of issues faced by families with increasing numbers of risks.

These costs do not equate to the total expenditure in England for these risks. This is because the estimated number is only for families with children under the age of 15, so exclude a large proportion of the population whose prevalence of the risk may be much greater. For example, homelessness people are more likely to be single.

**Table 11**
Combinations of risks for families with 3 or more risk factors (LSYPE)

| Number of families | Percent | Poor health | Alcohol | Violence | Crime | Care | Homeless | Estimated cost (£ millions) |
|---|---|---|---|---|---|---|---|---|
| 3,807 | 25.00 | x | | x | x | | | 88.0 |
| 2,929 | 19.23 | | x | x | x | | | 68.3 |
| 2,050 | 13.46 | x | x | x | | | | 42.5 |
| 1,757 | 11.54 | x | | | x | x | | 74.8 |
| 1,171 | 7.69 | | | | x | x | x | 78.4 |
| 1,171 | 7.69 | | | x | x | x | | 61.4 |
| 586 | 3.85 | | x | | x | x | | 25.1 |
| 586 | 3.85 | x | | x | x | x | | 32.8 |
| 292 | 1.92 | | | x | x | | x | 13.9 |
| 292 | 1.92 | | x | x | x | x | | 16.4 |
| 292 | 1.92 | x | | x | | x | | 14.6 |
| 292 | 1.92 | x | x | | | x | | 11.7 |

Source: Longitudinal Study of Young People in England (LSYPE), Wave 1. Notes: the sample contains 15,228 living in families with 3 or more risk factors.

**Table 12**
Estimated cost by risk factors, MCS & LSYPE (£)

| | MCS | | LSYPE | |
|---|---|---|---|---|
| | Total cost (million) | Average cost | Total cost (million) | Average cost |
| **One risk** | 4,672 | 6,012 | 9,102 | 10,012 |
| **Two risks** | 2,146 | 14,451 | 2,602 | 20,084 |
| **Three risks** | 247 | 22,059 | 479 | 32,049 |
| **Four risks** | 18 | 40,234 | 49 | 56,064 |
| **Total cost (estimated)** | **7,083** | **7,559** | **12,232** | **11,624** |

The estimated direct cost of dealing with multiple deprivation in England using indicators from the MCS is £2.8 billion (Table 13). The estimated cost of dealing with multiple deprivation in England using indicators from the LSYPE is £6.6 billion (Table 13).

**Table 13**
Estimated direct cost by risk factors, MCS & LSYPE (£)

| | MCS | | LSYPE | |
|---|---|---|---|---|
| | **Total cost (million)** | **Average cost** | **Total cost (million)** | **Average cost** |
| **One risk** | 2,086 | 2,684 | 4,740 | 5,214 |
| **Two risks** | 649 | 4,372 | 1,485 | 11,465 |
| **Three risks** | 81 | 7,246 | 329 | 22,038 |
| **Four risks** | 11 | 25,360 | 39 | 44,677 |
| **Total cost direct (estimated)** | **2,828** | **3,017** | **6,593** | **6,256** |

The estimated direct cost using the MCS is 40% of the estimated total cost. The estimated direct cost using the LSYPE is 50% of the estimated total cost. The difference is explained by two factors: first, differences in the prevalence of risk indicators, and second, the proportion of the estimated direct cost for each particular risk. For example, the most prevalent risk in the MCS is depression, whereas in the LSYPE is domestic violence. The estimated direct cost of Depression is only 4% if the estimated total cost, whereas for Domestic violence is 13%.

### *Cost analysis: synergies*

The above costing model assumes no synergies in treating risk factors for families who suffer from multiple risks. This means that, for example, a family who suffers from depression and domestic violence is treated separately from each of these issues, generating not only additional costs for the government but more importantly the inability to treat the root cause of multiple deprivation problems.

For the following estimations, we only assume cost sharing for direct costs. We do not assume cost sharing for indirect costs, such as output loss, as it is not clear

whether a person with two or more risks will have an indirect cost, which is more, or less, than the sum of each indirect costs for individual risks.

Based on the estimated costs shown in the appendix, we identify areas of synergies, or cost saving, for the different combinations of risk factors. These areas are based on the categorisation of Direct costs, Health, Criminal justice, Social services, Housing and other costs. For example, in treating depression and domestic violence we have information on the costs of providing health care for both risks, so health cost can be shared. In treating domestic violence and crime health, criminal justice, social services and housing costs can all be shared. Table 14 summarises the direct cost per area of expenditure which is our basis for the calculation of synergies.

**Table 14**
Direct cost according to area of expenditure (£)

| | Health | Criminal justice | Social services | Housing | Other direct costs |
|---|---|---|---|---|---|
| **Depression** | 139 | | | | |
| **Alcohol** | 331 | 2,144 | | | |
| **Violence** | 821 | 698 | 135 | 77 | |
| **Crime** | 2,547 | 1,261 | 290 | 323 | 1,455 |
| **Care** | 773 | | 13,373 | 19,656 | 2,350 |
| **Homelessness** | 7,000 | 1,500 | 2,000 | 14,000 | |

Having identifies the common areas of direct cost, the next step is to provide different scenarios for cost sharing. This is, in dealing with families with multiple risk, how much of the direct cost can be shared? We work under two scenarios. The first scenario assumes a cost sharing of 10% and the second assumes that the average cost doubles with two risks, triples with three risks and quadruples with four risks.

### *Scenario 1: 10% reduction is direct costs*

An example of scenario 1: for Depression and Alcohol, where there are Health care costs, rather than using 100% of Health cost for Depression and 100% of Health cost for Alcoholism, we assume 90% of the Health costs.

Table 15 shows the results from the reductions in cost of dealing with families of multiple deprivation in the MCS under scenario 1, i.e. direct costs reduced to 90%. We find that the total cost for dealing with families with 2 risks is reduced by 1.2% and the direct costs is reduced by 4.08%. For families with three risks, the total cost is reduced by 2.5% and the direct cost by 7.9%. Finally, for families with four risks the total cost is reduced by 6.2% and the direct cost by 10.2%.

The total cost under 10% synergies is £7.05 billion. This is a reduction of only 0.46% from the cost under no synergies. This cost, however, also includes all families with one risk factor, which carries with highest weight of the cost and also indirect costs. Hence, the reduction under scenario 1 is 1.2% of direct costs and 4.5% of direct costs for multiple risks (Table 15).

**Table 15**
Estimated reductions in cost under Scenario 1 for MCS (£ millions)

| | No risk sharing | | Scenario 1 (10%) | | | |
|---|---|---|---|---|---|---|
| | **Total** | **Direct** | **Total** | **Direct** | **% change** | **% change** |
| **One risk** | 4,672 | 2,086 | 4,672 | 2,086 | -- | -- |
| **Two risks** | 2,146 | 649 | 2,121 | 624 | 1.20 | 4.08 |
| **Three risks** | 247 | 81 | 241 | 75 | 2.47 | 7.93 |
| **Four risks** | 18 | 11 | 17 | 10 | 6.19 | 10.19 |
| **Total cost (estimated)** | 7,083 | 2,828 | 7,051 | 2,795 | 0.46 | 1.16 |
| **Total cost multiple risks** | **2,411** | **742** | **2,379** | **709** | **1.37** | **4.58** |

Table 16 shows the results from the reductions in cost of dealing with families of multiple deprivation in the LSYPE under scenario 1, i.e. direct costs reduced to 90%. We find that the total cost for dealing with families with 2 risks is reduced by 4.4% and the direct costs is reduced by 8.0%. For families with three risks, the total cost is reduced by 6.3% and the direct cost by 9.4%. Finally, for families with four risks the total cost is reduced by 5.6% and the direct cost by 7.2%.

The total cost under 10% synergies is £12.1 billion. This is a reduction of only 1.17% from the cost under no synergies. This cost, however, is 2.2% lower in direct costs and reduces by 8.2% the direct costs for families with multiple risks (Table 16).

**Table 16**
Estimated reductions in cost under Scenario 1 for LCYPE (£ millions)

| | No risk sharing | | Scenario 1 (10%) | | | |
|---|---|---|---|---|---|---|
| | **Total** | **Direct** | **Total** | **Direct** | **% change** | **% change** |
| **One risk** | 9,102 | 4,740 | 9,102 | 4,740 | -- | -- |
| **Two risks** | 2,602 | 1,485 | 2,491 | 1,375 | 4.44 | 8.04 |
| **Three risks** | 479 | 329 | 450 | 301 | 6.32 | 9.46 |
| **Four risks** | 49 | 39 | 47 | 37 | 5.63 | 7.17 |
| **Total cost (estimated)** | 12,232 | 6,593 | 12,090 | 6,452 | 1.17 | 2.20 |
| **Total cost multiple risks** | **3,130** | **1,854** | **2,988** | **1,712** | **4.74** | **8.27** |

*Scenario 2: average cost increases proportionally according to risk*

Table 17 shows the results from the reductions in cost of dealing with families of multiple deprivation in the MCS under proportional increments in average cost. We find that the total cost for dealing with families with 2 risks is reduced by 20%, with 3 risks by 22% and with 4 risks by 67%. The total reduction in cost is 6.3% and the total reduction in costs for families with multiple risks is 20.6%.

**Table 17**
Estimated reductions in cost under proportional increments in average cost (£, MCS)

| | No risk sharing | | Scenario 2 | | |
|---|---|---|---|---|---|
| | **Total million** | **Average** | **Total million** | **Average** | **% change** |
| **One risk** | 4,672 | 6,012 | 4,672 | 6,012 | -- |
| **Two risks** | 2,146 | 14,451 | 1,786 | 12,025 | 20.18 |
| **Three risks** | 247 | 22,059 | 202 | 18,037 | 22.29 |
| **Four risks** | 18 | 40,234 | 11 | 24,050 | 67.30 |
| **Total cost (estimated)** | 7,083 | 7,559 | 6,660 | 7,106 | 6.35 |
| **Total cost multiple risks** | **2,411** | | **1,999** | | **20.64%** |

Table 18 shows the results from the reductions in cost of dealing with families of multiple deprivation in the LSYPE under proportional increments in average cost. We find that the total cost for dealing with families with 2 risks is reduced by 0.3%, with 3 risks by 6.7% and with four risks by 40%. The total cost under this scenario is reduced by 0.43% and the total cost for families with multiple deprivation is reduced by 1.7%.

**Table 18**
Estimated reductions in cost under proportional increments in average cost (£, LSYPE)

| | No risk sharing | | Scenario 2 | | |
|---|---|---|---|---|---|
| | **Total million** | **Average** | **Total million** | **Average** | **% change** |
| **One risk** | 9,102 | 10,012 | 9,102 | 10,012 | -- |
| **Two risks** | 2,602 | 20,084 | 2,594 | 20,025 | 0.30 |
| **Three risks** | 479 | 32,049 | 449 | 30,037 | 6.70 |
| **Four risks** | 49 | 56,064 | 35 | 40,049 | 39.99 |
| **Total cost (estimated)** | 12,232 | 11,624 | 12,180 | 11,557 | 0.43 |
| **Total cost multiple risks** | **3,130** | | **3,078** | | **1.68** |

## Conclusions

The main objective of this paper is to estimate the costs of multiple risks for families. In doing so, we have developed a costing model that is applied to estimates of multiple risks based upon data extracted from the Millennium Cohort Study and the national Longitudinal Survey of Young People in England. The dataset is used to estimate the prevalence of multiple deprivation as well as the most common patterns for a number of stated risk factors. Using these risk patterns and the estimated number of families nationally, we applied to unit cost for each of these risks to estimate the total cost for the government.

The total cost of families caught in a cycle of low achievement is estimated to be £7.1 billion using indicators from the MCS and £12.2 billion using indicators from the LSYPE. The direct cost is estimated to be £2.8 billion using indicators from the MCS and £6.6 billion using indicators from the LSYPE. However, the above esti-

mates are based on the assumption that families are assisted by the government for each of these individual risk factors separately. In other words, a family suffering from depression and alcoholism will be treated from these problems separately by seeing different mental health specialists and social workers for each of them. One way to reduce the total cost for the government will be to deal with multiple risks in a more holistic manner, i.e. treating these problems together. Under this assumption, we provide two scenarios for cost reductions. In the first, we assume risk sharing for direct costs associated with multiple risks (i.e. 10% of direct costs in areas where there are synergies). The second assumes proportional increments in average costs (i.e. average cost for dealing with families with 2 risks is twice the cost for dealing with families with one cost).

Using the MCS, we find that the total cost for dealing with families with multiple risk is reduced by 1.3% under scenario 1 and by 20.6% under scenario 2. Using the LSYPE, the total cost for dealing with families with multiple risk is reduced by 4.7% under scenario 1 and 1.7% under scenario 2. Differences in the estimated cost reductions depend on the prevalence of risk identified in each of the datasets and the overlapping that there is between cost sharing for different problems. So, we found that the combinations of two risks for the families in the LSYPE data were such that to provide assistance to these families was more expensive than for the families in the MCS data who also had two risks. Hence, scenario 2 showed greater reductions for families in the MCS data. Still, a more realistic scenario is to assume a percentage of cost sharing for the different departments working with these families, i.e. health, education, social work.

Although we are assuming a constant cost sharing across all type of risks, it could be that cost sharing can be high for certain combination of risks. For instance, it may be that cost sharing is greater for families suffering from depression and alcoholism than for families suffering from alcoholism and who had a child being taken into care. We believe that a 10% cost sharing is a conservative estimate, given that in most of these cases practitioners who deal with families of multiple risks do not treat them in isolation, hence the potential reduction could be even larger.

Finally, it is important to highlight that these risks areas were selected to inform the costs model, and for this it was necessary to obtain reliable cost estimates from published research. It is noted, however, that these risk areas alone are likely to underestimate the full costs of managing the impact of multiple risks. For example, many of these families are likely to suffer from moderate or severe drug dependency issues, be in or recently suffered from high levels of debt or financial

stress and have lower levels of basic skills and educational achievement. It is important to know the financial burden for governments from each of these areas and to use information on synergies for cost sharing in order to develop a complete model of the cost of multiple deprivation. This will aid governments to plan over the longer term the financial repercussions of dealing with families of multiple deprivation.

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