

# Effects of unconditional and conditional cash transfers on child health and development in Zimbabwe: a cluster-randomised trial



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## Summary

**Background** Cash-transfer programmes can improve the wellbeing of vulnerable children, but few studies have rigorously assessed their effectiveness in sub-Saharan Africa. We investigated the effects of unconditional cash transfers (UCTs) and conditional cash transfers (CCTs) on birth registration, vaccination uptake, and school attendance in children in Zimbabwe.

**Methods** We did a matched, cluster-randomised controlled trial in ten sites in Manicaland, Zimbabwe. We divided each study site into three clusters. After a baseline survey between July, and September, 2009, clusters in each site were randomly assigned to UCT, CCT, or control, by drawing of lots from a hat. Eligible households contained children younger than 18 years and satisfied at least one other criteria: head of household was younger than 18 years; household cared for at least one orphan younger than 18 years, a disabled person, or an individual who was chronically ill; or household was in poorest wealth quintile. Between January, 2010, and January, 2011, households in UCT clusters collected payments every 2 months. Households in CCT clusters could receive the same amount but were monitored for compliance with several conditions related to child wellbeing. Eligible households in all clusters, including control clusters, had access to parenting skills classes and received maize seed and fertiliser in December, 2009, and August, 2010. Households and individuals delivering the intervention were not masked, but data analysts were. The primary endpoints were proportion of children younger than 5 years with a birth certificate, proportion younger than 5 years with up-to-date vaccinations, and proportion aged 6–12 years attending school at least 80% of the time. This trial is registered with ClinicalTrials.gov, number NCT00966849.

**Findings** 1199 eligible households were allocated to the control group, 1525 to the UCT group, and 1319 to the CCT group. Compared with control clusters, the proportion of children aged 0–4 years with birth certificates had increased by 1·5% (95% CI –7·1 to 10·1) in the UCT group and by 16·4% (7·8–25·0) in the CCT group by the end of the intervention period. The proportions of children aged 0–4 years with complete vaccination records was 3·1% (–3·8 to 9·9) greater in the UCT group and 1·8% (–5·0 to 8·7) greater in the CCT group than in the control group. The proportions of children aged 6–12 years who attended school at least 80% of the time was 7·2% (0·8–13·7) higher in the UCT group and 7·6% (1·2–14·1) in the CCT group than in the control group.

**Interpretation** Our results support strategies to integrate cash transfers into social welfare programming in sub-Saharan Africa, but further evidence is needed for the comparative effectiveness of UCT and CCT programmes in this region.

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## Introduction

Cash-transfer programmes are an increasingly popular approach to meet health and development needs of orphans and vulnerable children.<sup>1–3</sup> Unconditional cash transfers (UCTs) or conditional cash transfers (CCTs), which are made only when recipients comply with conditions typically related to their children's wellbeing, provide regular cash payments to households. Cash-transfer programmes can affect behaviour in several ways. Additional cash can help individuals to achieve specific behaviours—eg, by providing resources for transport costs and reducing pressure put on children to work during school hours. Implementation of conditions can

raise awareness about beneficial behaviours and provide additional incentives to overcome sociocultural barriers (eg, step-parents prioritising school attendance for their biological children rather than for their fostered children<sup>4</sup>).

UCT programmes for orphans and vulnerable children are believed to be easier to implement and more appropriate in low-income settings than are CCT programmes.<sup>5</sup> UCT programmes have been piloted in several sub-Saharan African countries with generalised HIV epidemics (eg, South Africa, Zambia, and Malawi).<sup>2</sup> However, cluster-randomised controlled trials from Latin America have shown that CCTs with school and health-clinic attendance conditions have positive effects on

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uptake of vaccinations<sup>6</sup> and school attendance.<sup>2,7</sup> A trial in Malawi<sup>8</sup> showed that both UCTs and CCTs reduced infection with HIV and herpes simplex virus 2 in female adolescents and is the only study in sub-Saharan Africa that has directly compared UCT with CCT.<sup>9</sup>

Because cash transfers are being considered as key components of social welfare programmes for orphans and vulnerable children in sub-Saharan Africa,<sup>2</sup> rigorous, peer-reviewed assessment of their effects on various outcomes is necessary in young and older children of both sexes. In this study, we investigated the effects of UCT and CCT on birth registration, vaccination uptake, and school attendance in children in Zimbabwe.

## Methods

### Study design and participants

The Manicaland HIV/STD Prevention Project is a population-based cohort study in 12 sites in Manicaland, Zimbabwe,<sup>10</sup> where 17% of individuals aged 15–49 years had HIV in 2006–08.<sup>11</sup> Sites were selected to represent four socioeconomic strata: subsistence farming areas, roadside trading settlements, agricultural estates, and small towns. The Project gathers data for HIV trends and the effect of the epidemic on the study population, including the effects on child wellbeing.

We did a matched, cluster-randomised controlled trial in these sites. Because of funding constraints, this trial was done in ten of the 12 original sites, but they represented all four socioeconomic strata. We used cluster randomisation to reduce conflict and contamination between households, which could arise if

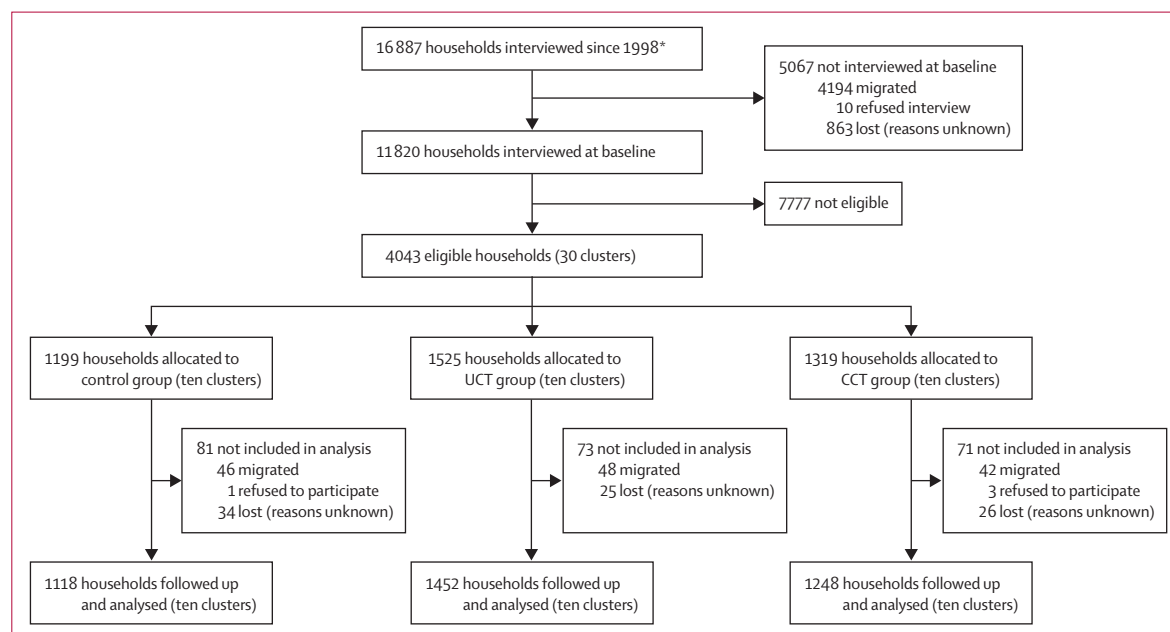
neighbouring households received different interventions. We divided each study site into three contiguous, socioeconomically homogeneous clusters, providing ten matched triplets of clusters.

Households within the clusters were eligible for inclusion in the trial when they contained children younger than 18 years and satisfied at least one other criteria at baseline: the head of the household was younger than 18 years; the household cared for at least one orphan (a child younger than 18 years with one or more deceased parents), disabled person, or an individual who was chronically ill; or the household was in the poorest wealth quintile. Households in the richest wealth quintile and those already receiving cash transfers for orphans and vulnerable children were not eligible.

We did a baseline survey of all households in the trial clusters between July, and September, 2009. We counted how many members made up each household and obtained information about trial endpoints and eligibility and exclusion criteria, including household asset data. We constructed a wealth index with a simple sum of reported household assets<sup>12</sup> (appendix). We ranked households according to their index score and then divided them into quintiles in each study site, thus identifying the poorest 20% of households in each site. We obtained informed consent from the most senior member of the household available at time of interview.

After the baseline survey, we passed lists of all households in the study clusters and their eligibility data to a non-governmental organisation (Diocese of Mutare Community Care Programme [DOMCCP]) so it could undertake community-based targeting. In every cluster,

See Online for appendix



**Figure 1: Trial profile showing participating households**

\*Interviewed by research assistants from the Biomedical Research and Training Institute (Harare, Zimbabwe).

groups of community leaders were asked to define characteristics of the poorest, poor, average, less poor, and least poor households and then to use these characteristics to assign households to five equally sized groups in their clusters on the basis of wealth.<sup>13</sup> Thus the community groups identified the poorest 20% of households in each cluster. The accuracy of the other eligibility data was also verified at community meetings.

Households had to be deemed to be eligible in the survey and in the community-based targeting and verification exercises to qualify for the interventions. One matched triplet (in a subsistence farming area; triplet 10) was used by DOMCCP as a pilot site; in these clusters, only the community-based targeting information was used. A follow-up survey was done in eligible households between March, and May, 2011.

Ethical approval was granted by Imperial College London's research ethics committee (ICREC\_9\_3\_10), Biomedical Research and Training Institute's institutional review board (AP81/09), and the Medical Research Council of Zimbabwe (MRCZ/A/1518).

### Randomisation and masking

After the baseline survey, clusters were randomly assigned to UCT, CCT, or control at public meetings that any community members could attend. In each site, one cluster was assigned to UCT, one to CCT, and one to control. Allocation was done by the drawing of lots from a hat. Participating households and individuals delivering the intervention were not masked to cluster assignment. At follow-up, research assistants were not told the allocation of the household they were interviewing, but questions were included at the end of the questionnaire about whether households received transfers. LR was masked when doing the primary analysis.

### Procedures

Community committees made up of the DOMCCP and other local stakeholders (eg, community health workers), who had experience of intervention delivery to vulnerable families through a network of local workers and volunteers, managed the cash-transfer programmes. DOMCCP enrolled eligible households in intervention clusters into the cash-transfer programmes. Every

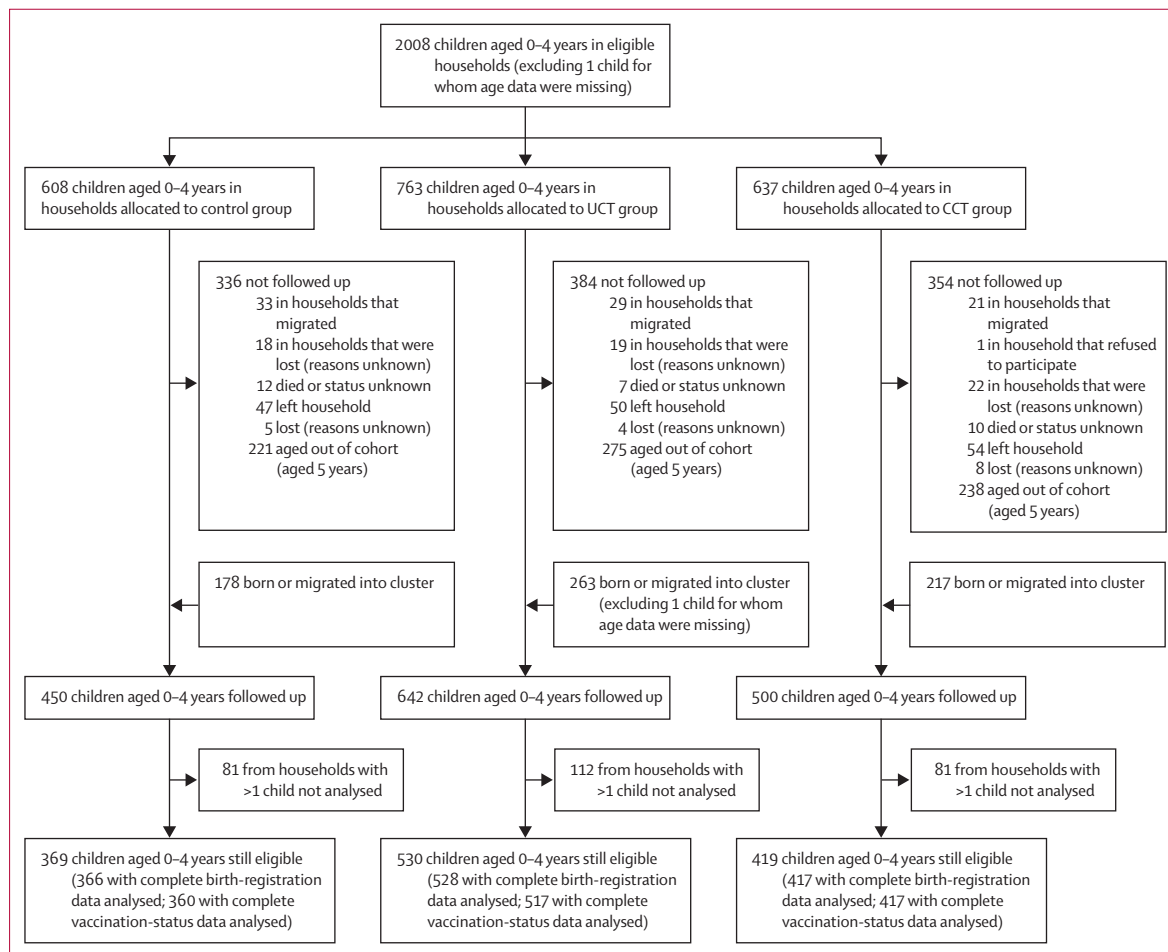


Figure 2: Trial profile showing children aged 0–4 years in participating households

household enrolled in the UCT programme collected US\$18 plus \$4 per child in the household (up to a maximum of three children) from designated pay points every 2 months.

Households in the CCT group could receive the same amount, but were monitored for compliance with several conditions: an application for a birth certificate had to be made within 3 months for all children younger than 18 years (including newborn babies) whose births had not been registered; children younger than 5 years had to be up-to-date with vaccinations and attend growth-monitoring clinics twice a year; children aged 6–17 years had to attend school at least 90% of the time per month; and a representative from every household had to attend two-thirds of local parenting skills classes held by DOMCCP. Compliance cards were issued to CCT households and were signed by service providers when

beneficiaries accessed services. The signed cards were brought to the pay points every 2 months, along with other documents such as birth certificates, child health cards, and receipts for the payment of school fees. DOMCCP checked cards and documents before issuing the cash transfers.

Community committees were familiar with most people living in the trial clusters. If a household provided a good reason for not meeting conditions (eg, a child missing school because of illness), it was verified by the committee and judged on a case-by-case basis. Spot checks were done by DOMCCP: schools and clinics were visited to verify attendance.

To allow households time to begin meeting conditions, we did not enforce conditions for 6 months at the start of the intervention. After this point, DOMCCP offered support at the first check if a household was not

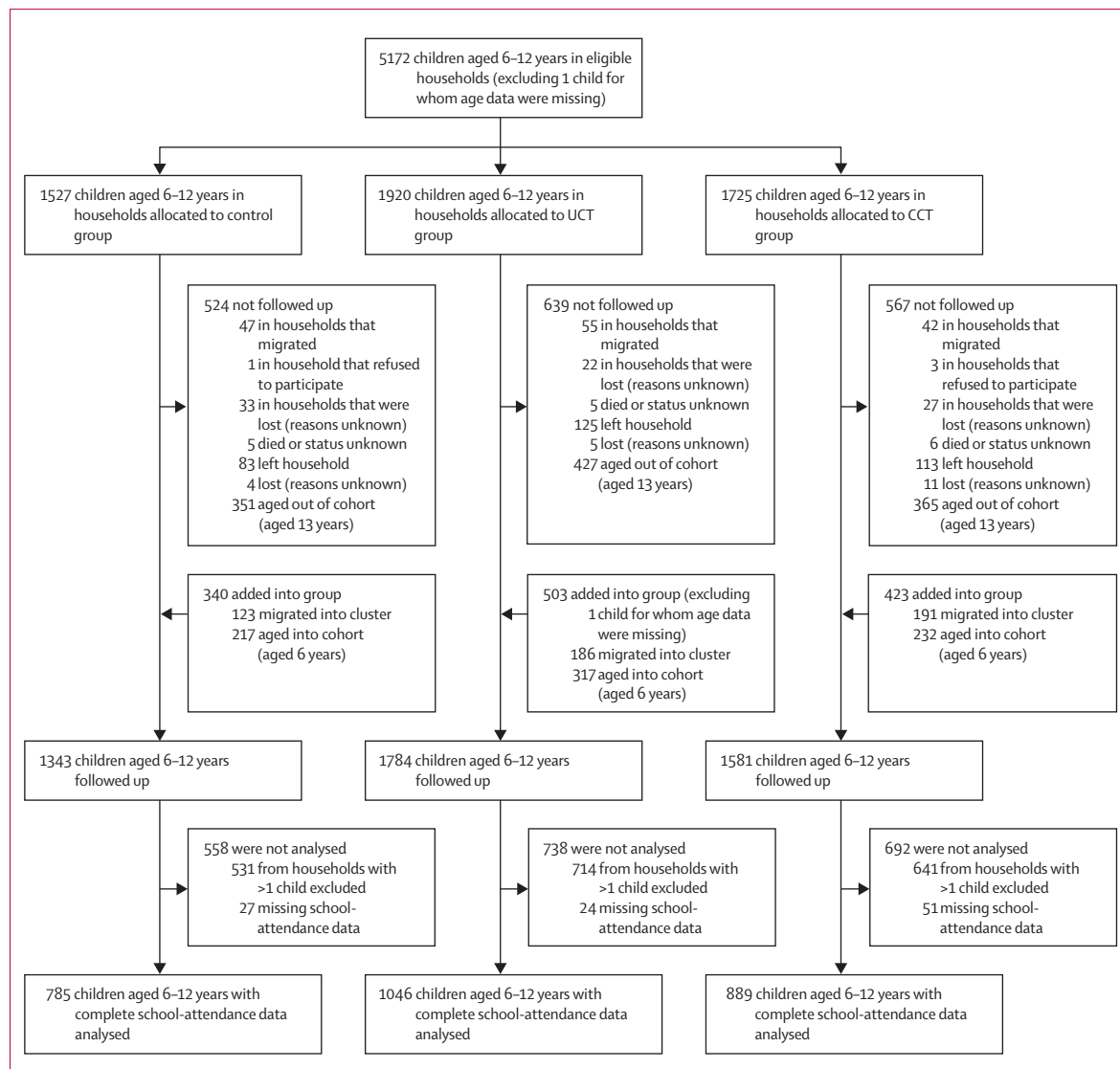


Figure 3: Trial profile showing children aged 6–12 years in participating households

complying with conditions. Households that were still non-compliant at the second check were assigned a community volunteer to help them to meet the conditions. If after another 4 months the household was still not meeting the conditions, the amount of their transfer was reduced by 10%. After a total of 6 months, the community volunteer assumed control of the household's transfers, with regular review by DOMCCP. If the household began meeting conditions, the volunteer was removed and the household received their full transfer. The CCT intervention was fairly soft—ie, households who did not meet conditions would rarely have received reduced transfers or stopped receiving them altogether.

The first cash disbursement happened in January, 2010. We planned to continue the intervention for 2 years, but funding for the programme was not renewed in March, 2011, amid government plans to begin a national

programme. The last disbursement took place in January, 2011. From September, 2010, DOMCCP provided parenting skills classes in all clusters, including control clusters. Eligible households in all clusters, including control clusters, received maize seed and fertiliser in December, 2009, and August, 2010.

We obtained data from eligible households for several primary endpoint indicators, which were selected to represent three domains of child wellbeing (identity, health, and education; appendix): proportion of children younger than 5 years with a birth certificate; proportion of children younger than 5 years with up-to-date vaccinations (measles; BCG; polio; and diphtheria, pertussis, and tetanus); and proportion of children aged 6–12 years attending school at least 80% of the time in the previous month. Additionally, we gathered data for the proportion of children aged 13–17 years in vulnerable

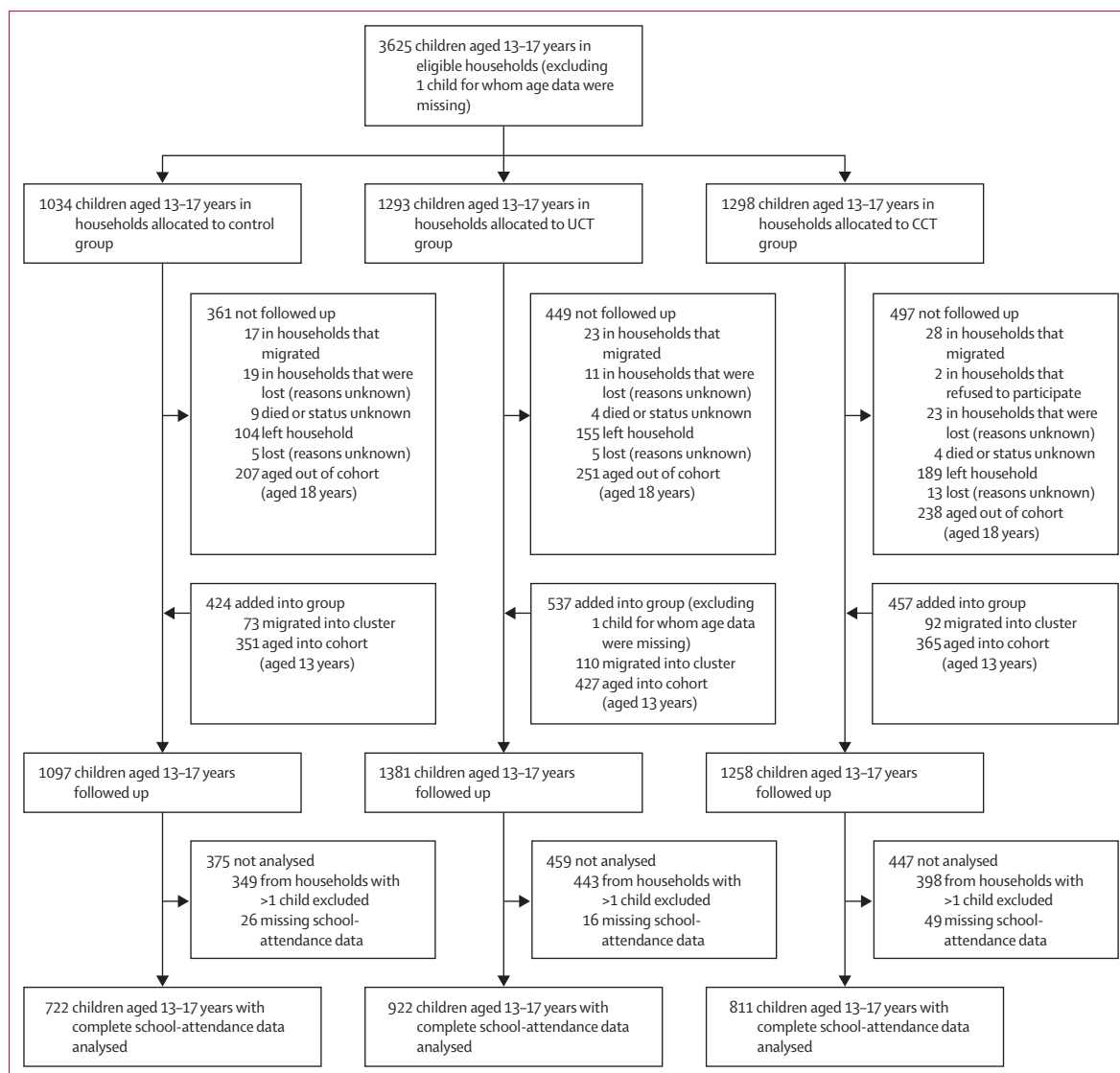


Figure 4: Trial profile showing children aged 13–17 years in participating households

households that attended school at least 80% of the time in the previous month. To assess attendance, household respondents were asked whether children aged 6–17 years were enrolled in school and, if yes, how many of the previous 20 school days had been missed.

**Statistical analysis**

We used Donner and Klar’s formula for sample-size estimation in matched, cluster-randomised controlled trials.<sup>14</sup> We based assumed baseline prevalences of endpoint indicators on national data for orphans and vulnerable children in Zimbabwe (2005):<sup>15</sup> 35% of children aged 0–4 years had a birth certificate and 51% were fully vaccinated, and 69% of children aged 6–12 years had good school attendance (having attended school at least once in the previous school year and not having been absent for more than 2 consecutive weeks). With 2003–05 data from Manicaland,<sup>10</sup> we estimated that the mean cluster size would be 27 children aged 0–4 years and 46 aged 6–12 years, assuming follow-up of 75% and that one child would be selected for analysis at random from households containing more than one child within each endpoint’s age range.

In an unmatched study, a reasonable estimate for the coefficient of variation (*k*) between clusters is 0.25.<sup>16</sup> With the assumptions of a modest reduction in *k* within our matched triplets of clusters (*k<sub>m</sub>*=0.18), roughly equal cluster sizes, 80% power, and a two-sided  $\alpha$  of 0.05, the

	Control group	UCT group	CCT group
Births registered (0–4 years)*	202/474 (43%)	242/590 (41%)	209/510 (41%)
Complete vaccination record (0–4 years)†	296/446 (66%)	358/547 (65%)	313/476 (66%)
School attendance ≥80% (6–12 years)‡	616/791 (78%)	788/1026 (77%)	691/896 (77%)
School attendance ≥80% (13–17 years)§	459/656 (70%)	538/830 (65%)	617/837 (74%)
Girls aged 0–4 years	238/493 (48%)	322/608 (53%)	249/519 (48%)
Girls aged 6–12 years	455/912 (50%)	563/1146 (49%)	489/988 (49%)
Girls aged 13–17 years	371/730 (51%)	447/907 (49%)	441/890 (50%)
Mean age of children aged 0–4 years (years)	2.3 (2.2–2.5)	2.4 (2.3–2.5)	2.4 (2.3–2.5)
Mean age of children aged 6–12 years (years)	9.2 (9.1–9.3)	9.2 (9.1–9.3)	9.2 (9.1–9.3)
Mean age of children aged 13–17 years (years)	14.9 (14.8–15.0)	14.8 (14.7–14.9)	14.9 (14.8–15.0)

Data are n/N (%) or mean (95% CI). UCT=unconditional cash transfer. CCT=conditional cash transfer. \**k*=0.156. †*k*=0.034. ‡*k*=0.061. §*k*=0.124.

**Table 1: Baseline characteristics**

	Births registered (children aged 0–4 years)			Complete vaccination record (children aged 0–4 years)			School attendance ≥80% (children aged 6–12 years)			School attendance ≥80% (children aged 13–17 years)		
	Control	UCT	CCT	Control	UCT	CCT	Control	UCT	CCT	Control	UCT	CCT
<b>Matched triplet</b>												
1 (agricultural estate)	9/26 (35%)	16/36 (44%)	28/58 (48%)	22/26 (85%)	34/36 (94%)	49/58 (84%)	30/42 (71%)	70/75 (93%)	73/90 (81%)	32/41 (78%)	59/64 (92%)	71/84 (85%)
2 (subsistence farming area)	6/15 (40%)	26/49 (53%)	19/32 (59%)	13/15 (87%)	44/49 (90%)	23/31 (74%)	27/29 (93%)	99/106 (93%)	75/82 (91%)	18/23 (78%)	99/105 (94%)	69/74 (93%)
3 (subsistence farming area)	17/33 (52%)	28/56 (50%)	19/29 (66%)	29/33 (88%)	54/56 (96%)	24/29 (83%)	69/82 (84%)	94/106 (89%)	82/87 (94%)	68/71 (96%)	79/86 (92%)	66/75 (88%)
4 (agricultural estate)	11/34 (32%)	23/51 (45%)	30/39 (77%)	30/34 (88%)	50/51 (98%)	37/40 (93%)	72/80 (90%)	95/102 (93%)	63/74 (85%)	62/68 (91%)	78/90 (87%)	62/63 (98%)
5 (small town)	21/42 (50%)	12/36 (33%)	29/48 (60%)	32/42 (76%)	29/35 (83%)	37/48 (77%)	70/89 (79%)	52/58 (90%)	102/111 (92%)	46/55 (84%)	38/43 (88%)	88/100 (88%)
6 (small town)	27/30 (90%)	59/83 (71%)	36/41 (88%)	21/26 (81%)	57/80 (71%)	31/40 (78%)	50/56 (89%)	90/124 (73%)	70/91 (77%)	42/48 (88%)	84/110 (76%)	74/76 (97%)
7 (roadside trading settlement)	12/35 (34%)	27/48 (56%)	28/37 (76%)	29/35 (83%)	33/46 (72%)	35/37 (95%)	82/110 (75%)	111/129 (86%)	73/85 (86%)	84/105 (80%)	109/117 (93%)	82/86 (95%)
8 (roadside trading settlement)	23/59 (39%)	19/57 (33%)	23/47 (49%)	32/57 (56%)	30/54 (56%)	33/47 (70%)	86/110 (78%)	92/112 (82%)	85/99 (86%)	88/111 (79%)	85/99 (86%)	92/102 (90%)
9 (subsistence farming area)	23/49 (47%)	26/63 (41%)	23/45 (51%)	13/51 (25%)	25/62 (40%)	19/46 (41%)	64/106 (60%)	113/140 (81%)	70/82 (85%)	74/118 (63%)	110/129 (85%)	66/74 (89%)
10 (subsistence farming area)	14/43 (33%)	19/49 (39%)	17/41 (41%)	32/41 (78%)	37/48 (77%)	29/41 (71%)	58/81 (72%)	79/94 (84%)	79/88 (90%)	56/82 (68%)	71/79 (90%)	65/77 (84%)
<b>Overall</b>	<b>163/366 (45%)</b>	<b>255/528 (48%)</b>	<b>252/417 (60%)</b>	<b>253/360 (70%)</b>	<b>393/517 (76%)</b>	<b>317/417 (76%)</b>	<b>608/785 (77%)</b>	<b>895/1046 (86%)</b>	<b>772/889 (87%)</b>	<b>570/722 (79%)</b>	<b>812/922 (88%)</b>	<b>735/811 (91%)</b>
Mean of cluster percentages	45% (34 to 56)	47% (39 to 54%)	62% (52 to 71)	75% (62 to 87)	78% (66 to 90)	77% (67 to 86)	79% (73 to 86)	86% (82 to 91)	87% (83 to 90)	80% (74 to 87)	88% (85 to 92)	91% (88 to 94)
Increase vs control*	..	1.5% (-7.1 to 10.1)	16.4% (7.8 to 25.0)	..	3.1% (-3.8 to 9.9)	1.8% (-5.0 to 8.7)	..	7.2% (0.8 to 13.7)	7.6% (1.2 to 14.1)	..	7.9% (1.4 to 14.4)	10.4% (3.9 to 16.9)
Adjusted increase vs control†	..	3.5% (-4.1 to 11.1)	17.0% (10.0 to 24.0)	..	1.5% (-5.8 to 8.7)	1.9% (-4.9 to 8.8)	..	7.1% (0.4 to 13.8)	7.6% (0.9 to 14.2)	..	8.4% (1.5 to 15.3)	10.0% (3.1 to 16.8)

Data are n/N (%) or % (95% CI). UCT=unconditional cash transfer. CCT=conditional cash transfer. \*Adjusted for matching. †Adjusted for baseline cluster-level percentages of endpoint indicators and, for the endpoints relating to children aged 0–4 years, the cluster-level percentages of children aged 0–4 years who were female (unbalanced at baseline).

**Table 2: Effects of UCT and CCT programmes**



trial was powered to show an improvement in the proportion of children aged 0–4 years with birth certificates to 53%, in the proportion of children aged 0–4 years fully vaccinated to 71%, and in the proportion of children aged 6–12 years with good school attendance to 89%. The trial was powered to compare the UCT and CCT groups separately with the control group.

Analysis was by intention to treat.<sup>14</sup> For each endpoint, we used a linear regression to estimate differences in the cluster-level prevalence of the indicator at follow-up, according to trial group. To account for matching, we included a variable representing the matched triplets in the regression models. Further analyses included the baseline cluster-level percentage of the endpoint indicators and any other indicators unbalanced at baseline as covariates. We tested for non-normality of the model residuals with the Shapiro-Wilk normality test. Additionally, we did sensitivity analyses (appendix).

The trial is registered with ClinicalTrials.gov, number NCT00966849. The protocol for this study was peer-reviewed and accepted by *The Lancet*; a summary of the protocol was published on the journal's website, and the journal then made a commitment to peer review the primary clinical manuscript.

### Role of the funding source

The Wellcome Trust and World Bank had no role in study design, data collection, data analysis, data interpretation, or writing of the report. UNICEF Zimbabwe was involved in study design. LR had full access to all the data in the study and had final responsibility for the decision to submit for publication.

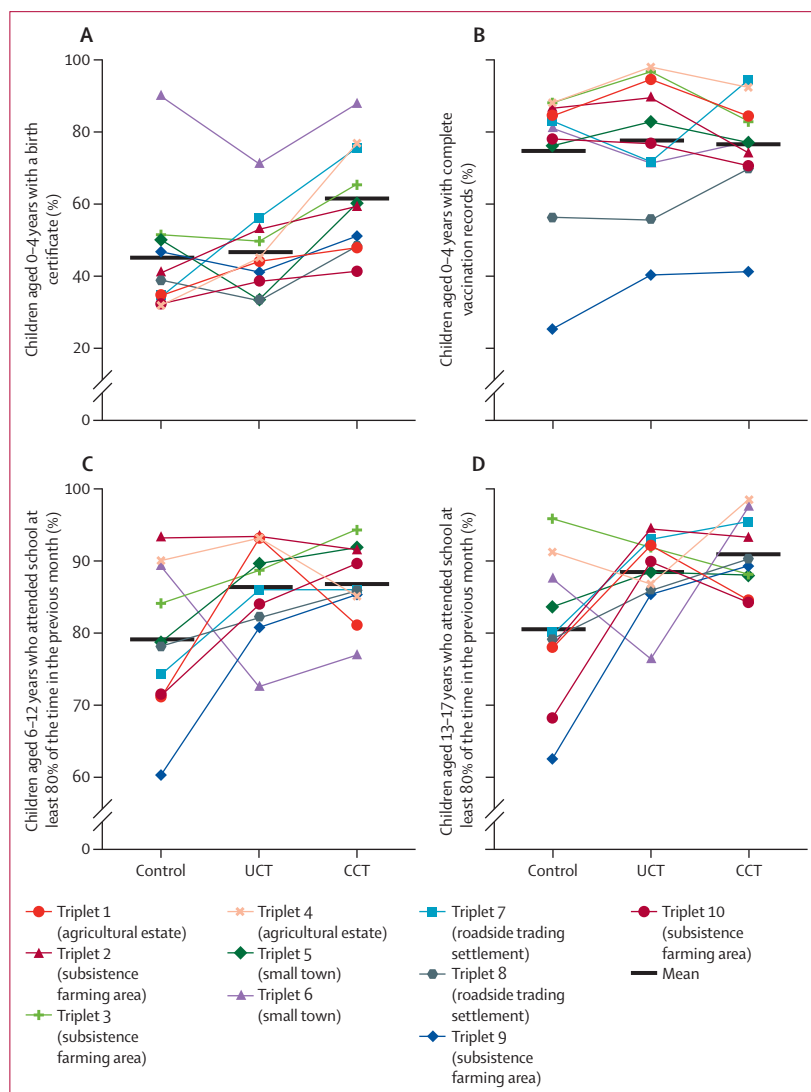
### Results

Figures 1–4 show the trial profile. 1302 (90%) of 1452 eligible households in the UCT group and 1205 (97%) of 1247 in the CCT group reported receiving cash transfers in 2010 (data for one household in CCT group missing). In the CCT group, 989 (83%) of 1187 households that reported receiving cash also reported having to meet conditions (data for conditions missing for 18 households). In the UCT group, 400 (31%) of 1297 eligible households that reported receiving cash also reported having to meet conditions (data for conditions missing for five households), suggesting some contamination between the UCT and CCT groups. Of 964 eligible CCT households for which data were available for volunteer assignment, 341 (35%) reported being assigned a volunteer to help them to meet conditions.

After randomisation, two villages (62 [53%] of 118 eligible households) in a control cluster (triplet 5; small town) were accidentally enrolled in the UCT programme. For ethical reasons, these households received transfers throughout the intervention period. For all endpoints, we were missing data for less than 4% of children who were followed up in each group (figures 2–4). Missing data were excluded from the analysis.

Most baseline characteristics were similar across the three groups (table 1). However, the proportion of children aged 0–4 years who were female was slightly higher and the proportion of children aged 13–17 years who attended school at least 80% of the time in the previous month was slightly lower in the UCT group than in the other groups (table 1).

We recorded no evidence of non-normality of model residuals. The increase in proportion of children aged 0–4 years with a birth certificate compared with the control group was significant in the CCT group but not in the UCT group (table 2, figure 5). The proportions of children aged 0–4 years with complete vaccination records were similar across groups (table 2, figure 5). The proportions



**Figure 5: Effects of UCT and CCT programmes on the primary and additional endpoints**  
Comparison of proportion of (A) children aged 0–4 years with a birth certificate, (B) children aged 0–4 years with complete vaccination records, (C) children aged 6–12 years who attended school at least 80% of the time in the previous month, and (D) children aged 13–17 years who attended school at least 80% of the time in the previous month. UCT=unconditional cash transfer. CCT=conditional cash transfer.

of children aged 6–12 years who had attended school at least 80% of the time in the previous month were higher in the UCT and CCT groups than in the control group, with the intervention groups having similar increases (table 2, figure 5). The proportions of children aged 13–17 years who had attended school at least 80% of the time in the previous month were higher in the UCT and CCT groups than in the control group, with a somewhat greater difference in the CCT group (table 2, figure 5).

The proportion of children with birth certificates and those aged 6–12 years with good school attendance was higher in households that reported having to comply with conditions than in those that did not (appendix). Additionally, we repeated our primary analysis excluding the affected matched triplets of clusters in which two villages in the control cluster were enrolled in the

UCT programme and where only information about community-based targeting was used; the results were consistent with the primary findings (appendix).

## Discussion

We have shown that UCT and CCT significantly increased the proportion of children with good school attendance in Manicaland, Zimbabwe. CCT, but not UCT, significantly increased the proportion with a birth certificate. However, neither programme significantly increased the proportion with a complete vaccination record. Our conditions were soft—ie, households received support to meet conditions before their transfers were reduced. In view of the 6-month initial grace period, it is unlikely that many households received reduced transfers when they did not meet conditions. Therefore, identification of the specific component of the CCT programme that produced the reported effects is difficult. Interpretation is further complicated by the potential for respondents in the UCT and CCT groups to have been affected by the evaluation process: community awareness about the aims of the project could have affected actual or reported behaviours (eg, emphasis on school attendance as an outcome of the assessment by programme implementers could have encouraged caregivers to send their children to school).

Several factors could explain why CCT, but not UCT, had a large effect on birth registration. First, the proportion of children in the region with a birth certificate at baseline was less than 50%, which was probably related to bureaucratic barriers and poor awareness about birth registration. Second, DOMCCP helped many households in the CCT group to obtain birth certificates. Third, birth registration is a one-time event; it does not have to be maintained. Reviews<sup>17,18</sup> suggest that economic incentives most effectively affect behaviours in the short term.

Neither UCT nor CCT significantly increased the proportion of children with up-to-date vaccinations. A previous systematic review<sup>6</sup> showed that CCT positively affected vaccination coverage when conditions included attendance at preventive health-care services.<sup>19</sup> In Manicaland, vaccinations are often delivered via mobile outreach, and cash transfers might not affect access to these services. Furthermore, measles and BCG vaccination coverage was high at baseline (>94%; appendix), restricting the potential for the interventions to increase uptake.

In Malawi, both UCT and CCT improved school attendance in adolescent girls, although CCT produced the largest effect.<sup>20</sup> In our study, the effect of CCT on school attendance was only slightly larger than was the effect of UCT. In the 1980s, Zimbabwe expanded education services; adult literacy and school enrolment remain high compared with other sub-Saharan African countries.<sup>21</sup> Therefore, conditions might not be necessary to raise awareness about the benefits of education, which leaves poverty as the principal barrier to school

### Panel: Research in context

#### Systematic review

Two systematic reviews<sup>2,6</sup> of unconditional cash transfer (UCT) and conditional cash transfer (CCT) programmes formed the basis of our review. We supplemented the information from the systematic reviews with a search of PubMed for reports published in English with the search terms “cash\*” and “transfer\*”. We used no date restrictions. Few rigorous assessments of UCT programmes have been reported. Adato and Basset<sup>2</sup> did a review of cash transfers in the context of HIV epidemics, which included ten UCT programmes. All studies that reported quantitative evaluation data were included in the review. Adato and Basset<sup>2</sup> reported positive effects of UCT interventions on a range of outcomes in several countries in sub-Saharan Africa, including increased school enrolment and attendance in children in South Africa,<sup>22,23</sup> Zambia,<sup>24</sup> and Malawi.<sup>25</sup>

Many rigorous assessments of CCT programmes have been done, largely in Latin America. A systematic review<sup>6,26</sup> of the effects of CCT interventions on health outcomes identified eight studies from Latin America that conditioned transfers on health behaviours. In most studies, the transfers were also conditioned on school enrolment or attendance, or both. The interventions targeted poor households and communities. Four<sup>19,27–29</sup> of six studies that investigated the effects of CCT programmes on child-related health-seeking behaviours showed significant positive effects. All four studies (from Colombia,<sup>27</sup> Honduras,<sup>28</sup> Mexico,<sup>29</sup> and Nicaragua<sup>19</sup>) that investigated the effects of CCT on immunisation coverage reported positive effects, although these results were sometimes limited to specific age groups and vaccine types and, in Mexico, the positive effects attenuated with time.<sup>6</sup> Studies not included in the systematic review have also showed positive effects of CCT programmes on school attendance in Latin America.<sup>2,7</sup>

Few studies have compared the effects of UCT and CCT programmes in the same setting. Baird and colleagues<sup>8</sup> analysed data from a trial of UCT and CCT in Malawi and reported no significant differences between UCT and CCT groups, although cash transfers significantly reduced infections with HIV and herpes simplex virus 2 in adolescent girls. In a secondary analysis,<sup>20</sup> they showed that the CCT programme, which was conditional on regular school attendance, had a significantly greater positive effect on school enrolment and performance than did the UCT programme, but that teenage pregnancy and marriage were significantly more frequent in adolescent girls in the CCT group than in those in the UCT group.

#### Interpretation

Our results support strategies to integrate cash transfers into social welfare programming in sub-Saharan Africa. Further evidence is needed for the comparative cost-effectiveness of UCT and CCT programmes in low-income settings with high HIV prevalence in sub-Saharan Africa.



attendance. However, the larger effect in the CCT group suggests that conditions—either through support or provision of a direct incentive—could also help to increase school attendance.

Strengths of our study were its cluster-randomised design, large sample size, low numbers of households that refused to participate, and high follow-up. Our clusters represent four different area types, which improves generalisability to similar rural areas in southern and eastern Africa. However, we did the study shortly after a period of economic crisis in Zimbabwe, which could limit this generalisability. We probably missed some vulnerable children—eg, those living in institutions. However, most vulnerable children in Zimbabwe are cared for in households, usually within the extended family.<sup>4</sup>

We did record evidence of contamination between groups: almost a third of UCT households reported having to comply with conditions. UCT households could have been inadvertently exposed to awareness campaigns about conditions, which were done in the study areas. DOMCCP representatives work throughout our study clusters; UCT households that reported having to comply with conditions could have also accessed support from these workers. Our finding that households that reported having to comply with conditions had higher proportions of children with birth certificates and good school attendance than did households that did not have to meet conditions could have meant that the intention-to-treat analysis overestimated the effect of the UCT. Furthermore, two control villages were accidentally enrolled into the UCT programme, which might have meant we underestimated the effects of the cash transfers in our intention-to-treat analysis.

Our study was limited by the short intervention period. Whether the effects of the programmes would change with time is unclear. The follow-up survey was done 2 months after interventions had finished, so fear of penalties should not have biased responses from CCT households, although the effects of the programmes could have attenuated by the time of the survey.

Overall, our results support strategies to integrate cash transfers into social welfare programming for orphans and vulnerable children that are presently implemented in several sub-Saharan Africa countries (panel). Further work is needed to assess whether the increased costs associated with monitoring compliance with conditions is compensated by greater improvements in child-welfare outcomes.

#### Contributors

All authors contributed to study design and data interpretation. LR, PM, JWE, LD, GM, JM, CS, TC, CN, and SG contributed to delivery of the intervention, planning, and data collection. LR, PM, JWE, LD, GM, JM, RM, GPG, CN, and SG did primary data analysis. PM, LD, GM, JM, and RM contributed to supplementary analyses. LR, JWE, and SG wrote the report; all authors approved the final version.

#### Conflicts of interest

We declare that we have no conflicts of interest.

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